



# **AGENDA OF THE GREEN BAY PLAN COMMISSION**

**FRIDAY, MARCH 15, 2024, 12:30 PM**  
**City Hall, Room 604 - The Harry Maier Room.**  
**Virtual attendance is also available via Zoom.**

## **A. Zoom Meeting Information.**

- I. Join Zoom Meeting Online:  
<https://us02web.zoom.us/j/82450816526>

Or call in by phone: +1 312 626 6799  
Meeting ID: 824 5081 6526

If you wish to speak at this public meeting or leave a comment, please fill out the online [Comment Form](#) prior to the meeting. More detailed [Zoom Instructions](#) can be found online.

## **B. Roll Call.**

- I. Members: Chair Lisa Hanson, Vice-Chair Jacob Miller, Ald. Jim Hutchison, Sidney Bremer, Derius Daniels, Ken Rovinski, and Michael Poradek.

## **C. Approval of the Agenda.**

- I. Approval of the agenda for the Friday, March 15, 2024, meeting of the Green Bay Plan Commission.

## **D. Approval of Minutes.**

- I. Approval of the minutes from the Monday, February 26, 2024, meeting.

## **E. Regular Business.**

- I. (ZP 24-05) Public hearing on the request for a Conditional Use Permit (CUP) to allow the development of a solar energy farm on a 13-acre property at the southwest corner of Greenbrier Road and Ontario Road (# 21-165-2). Submitted by Brian Rasmussen of Aurora BayCare Medical Center on behalf of BayCare Aurora LLC, property owner (Ald. J).

Hutchison, District 2).

2. (ZP 24-05) Consideration with possible action on the request for a Conditional Use Permit (CUP) to allow the development of solar energy farm on a 13-acre property at the southwest corner of Greenbrier Road and Ontario Road (# 21-165-2). Submitted by Brian Rasmussen of Aurora BayCare Medical Center on behalf of BayCare Aurora LLC, property owner (Ald. J. Hutchison, District 2).
3. (CSM 24-07) Consideration with possible action on a request to create a 4-lot Certified Survey Map that includes public street dedication at 0 Lime Kiln Road (Parcel 23-243-1), submitted by Department of Community and Economic Development on behalf of the Redevelopment Authority of the City of Green Bay, Property Owner (Ald. Morgan, District 3).
4. (VR 23-05) Consideration with possible action on the request to amend VR 23-05 to include deviations from Sections 36-415 and 36-416 of the Green Bay Municipal Code for the extension of Hinkle Street in the proposed Southwest Woods Subdivision, submitted by Garritt Bader related to property owned by GB HMC West Mason LLC, Schaetz Family LLC, and the Green Bay Parks Department (Ald. M. Eck, District 11).

#### **F. Informational.**

1. Director's report.
2. Date of the next meeting: Monday, April 8, 2024.

#### **G. Adjournment.**

- 1) THIS MEETING IS RECORDED: THE VIDEO OF THIS MEETING AND MINUTES ARE AVAILABLE ONLINE AT [www.greenbaywi.gov](http://www.greenbaywi.gov)
- 2) ACCESSIBILITY: Any person wishing to attend who requires special accommodation because of a disability, should contact the City Safety Manager at 920-448-3125 at least 48 hours before the scheduled meeting time so that arrangements can be made.
- 3) QUORUM: Please take notice that a majority or quorum of the Common Council will attend this Plan Commission meeting and will constitute a meeting of the Common Council for purposes of discussion and information gathering relative to this agenda.
- 4) REPRESENTATION: The party requesting the communication, or their representative, should be present at this meeting.





## Report to the Green Bay Plan Commission

### MEETING DATE

March 15, 2024

### PREPARED BY

David Buck, Staff

### AGENDA ITEM # E.1

(ZP 24-05) Public hearing on the request for a Conditional Use Permit (CUP) to allow the development of a solar energy farm on a 13-acre property at the southwest corner of Greenbrier Road and Ontario Road (# 21-165-2). Submitted by Brian Rasmussen of Aurora BayCare Medical Center on behalf of BayCare Aurora LLC, property owner (Ald. J. Hutchison, District 2).

### BACKGROUND

### RECOMMENDATION

### FISCAL IMPACT

### ATTACHMENTS

None



## Report to the Green Bay Plan Commission

### MEETING DATE

March 15, 2024

### PREPARED BY

David Buck, Staff

### AGENDA ITEM # E.2

(ZP 24-05) Consideration with possible action on the request for a Conditional Use Permit (CUP) to allow the development of solar energy farm on a 13-acre property at the southwest corner of Greenbrier Road and Ontario Road (# 21-165-2). Submitted by Brian Rasmussen of Aurora BayCare Medical Center on behalf of BayCare Aurora LLC, property owner (Ald. J. Hutchison, District 2).

### BACKGROUND

**Reason for Request:** To allow the development of a ground mounted solar energy farm within the I-43 Business Center Light Manufacturing District. The Business Center's land use regulations are governed by a Planned Unit Development, which requires a Conditional Use Permit.

**Surrounding Zoning and Land Uses:**

**SUBJECT:** Planned Unit Development (PUD)-Light Manufacturing Undeveloped

**NORTH:** Planned Unit Development (PUD)-Light Manufacturing Undeveloped

**SOUTH:** Village of Bellevue S-F Residential

**EAST:** Planned Unit Development (PUD)-Light Manufacturing

**WEST:** Planned Unit Development (PUD)-Light Manufacturing Office

**Comprehensive Plan:** The 2022 Smart Growth Plan designates this area for Business Park use.

Consistency Analysis: While Ch. 66.1001 Wis. Stats. does not specifically require conditional uses to meet the consistency requirement, the proposed conditional use permit is not inconsistent with the comprehensive plan.

**Report:** The subject 13-acre undeveloped property is located at the southwest corner of Greenbrier Road and Ontario Road at the southern edge of the I-43 Business Center. It has approximately 1,300 feet of frontage along Greenbrier Road and approximately 500 feet of frontage along Ontario Road. The site's topography is relatively flat but includes steeper slopes and wetlands on its southern and southwestern portions of the property. It is designated / zoned for light manufacturing uses within the I-43 Business Center PUD. However, as solar power generation is not listed as a permitted principal use, it must receive a Conditional Use Permit to be established. The I-43 Business Center was first created in the late 1980s with protective covenants, which have been amended over time. The covenants are designed to ensure high quality development by making the center a quality place to do business, making the business center an aesthetically pleasing environment and adding protection for uses that traditional zoning districts within the city do not.

The petitioner is Aurora BayCare Medical Center, which is situated west down Greenbrier Road about one third of a mile. They are proposing to develop approximately 8.73 acres of the 13-acre property (67%) to help meet Aurora BayCare's long-term energy goals while providing a reduced carbon footprint as well as further the corporate commitment of sustaining campus needs. The proposal includes the installation of a 5,000-unit ground-mounted panel solar energy farm, an approximately 200 square feet area for mechanical equipment on the Ontario Road frontage and an access drive from Ontario Road leading to an internal drive

lane and two-stall parking area. The solar panels are 20 feet in height, are stationary/do not rotate, and contain a non-glare coating to minimize any brightness on surrounding property. A seven-foot-tall chain link fence with fabric surround/wrap is proposed to surround the entirety of the solar farm area. The petitioner plans to soften and screen the project as well by installing a very dense combination of trees and shrubs between the fence and the right-of-way as well as along the south lot line, where wetland locations permit. It is important to note that beyond new plantings there is a substantial amount of vegetation within and outside the wetland areas along the southern lot line that the petitioner will retain to not only screen the project from the adjoining neighbors to the south but to also address the Business Park's goal to have a park-like setting.

In the review of the CUP, Zoning Ordinance Section 44-83(e) establishes seven standards for the Plan Commission to consider:

- (1) The establishment, maintenance, or operation of the conditional use will not be detrimental to or endanger the public health, safety, or general welfare.
- (2) The establishment of the conditional use will not impede the normal and orderly development and improvement of the surrounding property for uses permitted in the district.
- (3) The conditional use, its exterior architectural design, and functional plan of any proposed structure will not be injurious to the use of other property in the immediate vicinity nor substantially diminish or impair property values within the surrounding neighborhood.
- (4) Adequate utilities, access roads, drainage, and/or necessary facilities have been or are being provided.
- (5) Adequate measures have been or will be taken to provide ingress and egress and so designed as to minimize traffic congestion.
- (6) Adequate parking facilities as specified in Article XVIII of this chapter.
- (7) The conditional use shall, in all other respects, conform to the applicable regulations of the district in which it is located and all other applicable City ordinances.

The staff believe this type of use is not the highest and best use for property within the Business Center as it typically has a far lower property value than other manufacturing uses, is not an employment generator, is not an activity / destination use, and is difficult to design with the overall aesthetic purposes of the business center. However, staff feels this request meets the standards for Conditional Use Permit approval, with conditions. It will not be detrimental to the public health, safety and welfare; it will not impede orderly development, especially as this use can be easily removed if the site is to be redeveloped; the design will not diminish property values in the area; it has adequate utilities to service it; adequate measures are provided to provide access and parking and the overall use will conform to all regulations of the I-43 Business Center PUD. This use remains quite passive as compared to existing use. Permitted light manufacturing uses include a variety of options, including 89 individual manufacturing operations and public warehousing facilities. A list of permitted uses within the light manufacturing area is included in this packet.

There are a few items on the plans provided within the CUP application that will need to be adjusted to meet code and receive administrative site plan approval such as drive aisle size and driveway design/location, but overall, the submission meets the regulatory requirements of the Light Manufacturing District. To advance the intent and purpose of the I-43 Business Center as well as protect neighboring properties from negative impacts, staff recommends that the exterior landscaping be located between the fence and the right-of-way, the fence fabric surround/wrap be an earthtone color, fence around the mechanical units along Ontario Road be 100% solid so that the mechanicals are not visible from the right-of-way and all panels be stationary to eliminate noise as well as be the non-glare style of panel to eliminate glare off-site.

The applicant sent a letter and personally walked the neighborhood to introduce the project and receive feedback. Alderperson Hutchison and property owners within 400-ft of the subject site have been notified of the request by the City via notification letters as well as the installation of two zoning action signs along the frontages. As of the drafting of this report, staff received an inquiry about the request and three

objections from nearby single-family homeowners.

## RECOMMENDATION

Approval of the request, subject to the following conditions:

1. Compliance with all other regulations of the Green Bay Municipal Code.
2. Exterior landscaping be located between the fence and the right-of-way, as proposed;
3. Fences fabric surround/wrap be an earthtone color;
4. The fence around the mechanical units along Ontario Road be 100% solid vinyl so the mechanicals are not visible from the right-of-way; and
5. All panels are stationary and non-glare style.

## FISCAL IMPACT

## ATTACHMENTS

1. ZP 24-05 Application Package
2. ZP 24-05 Location Map
3. ZP 24-05 Draft Resolution
4. ZP 24-05 Planting and Restoration Concept Site Plan
5. I-43 Protective Covenants Light Manufacturing Uses
6. I-43 Business Center Map
7. 24-05 Public Outreach Letter
8. 24-05 Public Comment\_Gajeski\_1549 Diamond Court
9. Health-and-Safety-Impacts-of-Solar-Photovoltaics-North Carolina State University



## REQUEST FOR CITY ACTION PLAN COMMISSION

Community and Economic  
Development Department  
100 N. Jefferson Street, Rm 608  
Green Bay, WI 54301-5026  
(920) 448-3400 - phone  
(920) 448-3426 - fax  
www.greenbaywi.gov

Location of Property: 3099 Greenbrier Road

Parcel Number(s): 21-165-2

Petitioner(s): Aurora BayCare Medical Center (Brian Rasmussen) Date: 02/14/2024

Email: brian.rasmussen@aah.org Phone Number: 920-288-4024

Address: 2845 Greenbrier Road City: Green Bay State: WI Zip: 54311

Property Owner: Same as petitioner (Director of Support Services) Phone Number: Same as contact above

**Submit this Request Form and all required attachments to the Community and Economic Development Department, Room 608, City Hall**

To: Honorable Mayor and Common Council, c/o City Clerk

I, Brian L. Rasmussen, respectfully request that the City of Green Bay take the following action:

- ☐ Rezone Property (\$375.00 Review Fee)
- ☒ Conditional Use and CUP Amendment, including Single Lot Duplexes (\$375.00 Review Fee)
- ☐ PUD and PUD Amendments (\$425.00 Review Fee)
- ☐ Approve Preliminary City/Extraterritorial Subdivision Plat (\$150.00 + \$35.00 per Lot/Outlot Review Fee)
- ☐ Approve Preliminary Condominium Plat (\$250.00 + \$35.00 per Lot/Outlot/Lot Equivalent Review Fee)
- ☐ Approve Preliminary City/Extraterritorial Certified Survey Map (\$250.00 Review Fee)
- ☐ Approve Final City/Extraterritorial Subdivision Plat (\$150.00 Review Fee)
- ☐ Approve Final Condominium Plat (\$150.00 Review Fee)
- ☐ Grant a City/Extraterritorial Subdivision/CSM Variance (\$150.00 Review Fee)
- ☐ Development District Map Amendment (\$200.00 Administration Fee)
- ☐ Official Map Amendment (\$200.00 Administration Fee)
- ☐ Plat of Right-of-Way (\$200.00 Administration Fee)
- ☐ Discontinue a Public Utility Easement (\$200.00 Administration Fee)
- ☐ Street Name Change (\$200.00 Administration Fee)
- ☐ Declare City Property "City Surplus" (\$200.00 Administration Fee)
- ☐ Vacate a Street/Alley/Pedestrian Way (\$300.00 Administration Fee) PLEASE FILL OUT PAGE 2 OF APPLICATION
- ☐ Closure of Street/Alley/Pedestrian Way (\$300.00 Administration Fee) PLEASE FILL OUT PAGE 2 OF APPLICATION
- ☐ Comprehensive Plan Amendments (\$275.00 Review Fee)
- ☐ Other (\$200.00 Administration Fee):

Owner Signature: [Signature]

Date: 2/8/24

Petitioner Signature(s): [Signature]

2/8/24

### Checklist of required attachments:

- Map
- Legal Description
- Applicant Narrative Describing Project
- All Other Pertinent Information

For office use only:

Review Fee: \_\_\_\_\_ Receipt No.: \_\_\_\_\_ Zoning Petition No.: \_\_\_\_\_

# Aurora BayCare Medical Center

Now part of  ADVOCATEHEALTH

February 12<sup>th</sup> 2024

To whom it May Concern-Potential Solar Project, Aurora BayCare Medical Center

All: We are requesting the approval of a solar ground mount project located at 3099 Greenbrier Rd in Green Bay WI. We are looking to install this system so we can meet our long-term site energy goals while providing a reduced carbon footprint to our current energy model.

This project will also align with our commitment to our community and our investment of sustaining our campus needs for many years into the future.

Please contact me with any further questions.

Best Regards



Brian Rasmussen  
Director, Support Services  
Aurora BayCare Medical Center  
920-288-4024  
brian.rasmussen@aah.org



Map printed on  
2/6/2024



1:4,800

1 inch = 400 feet\*

1 inch = 0.0758 miles\*

*\*original page size is 11" x 17"*  
*Appropriate format depends on zoom level*

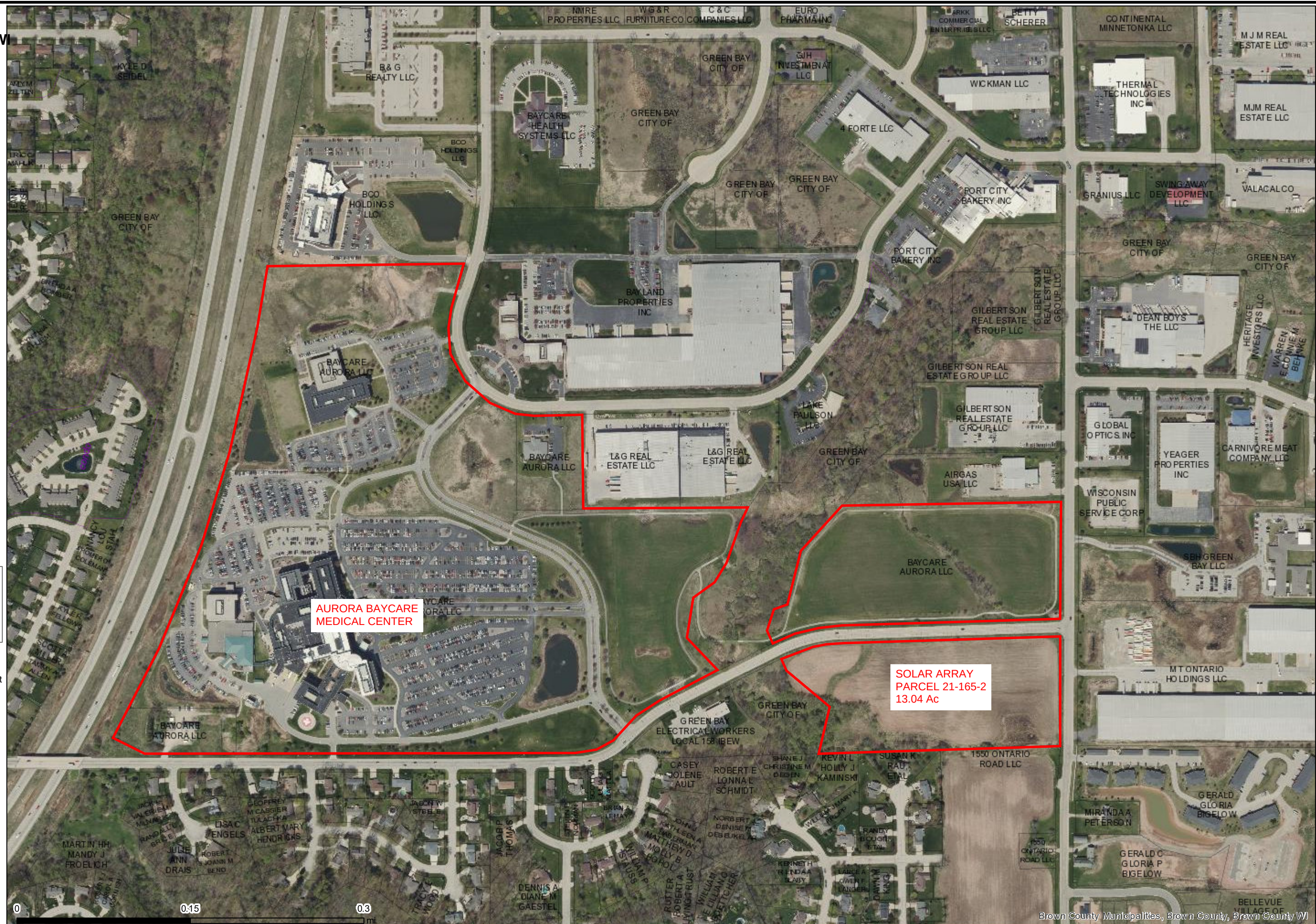
A map key/legend is available at  
[tinyurl.com/BrownDogLegend](http://tinyurl.com/BrownDogLegend)

This is a custom web map  
created by an online user  
of the GIS map services  
provided by the  
Brown County Wisconsin  
Planning & Land Services  
Department



(920) 448-6480

[www.browncountywi.gov](http://www.browncountywi.gov)







Map printed on  
2/6/2024



1:2,400

1 inch = 200 feet\*

1 inch = 0.0379 miles\*

\*original page size is 11" x 17"  
Appropriate format depends on zoom level

A map key/legend is available at  
[tinyurl.com/BrownDogLegend](http://tinyurl.com/BrownDogLegend)

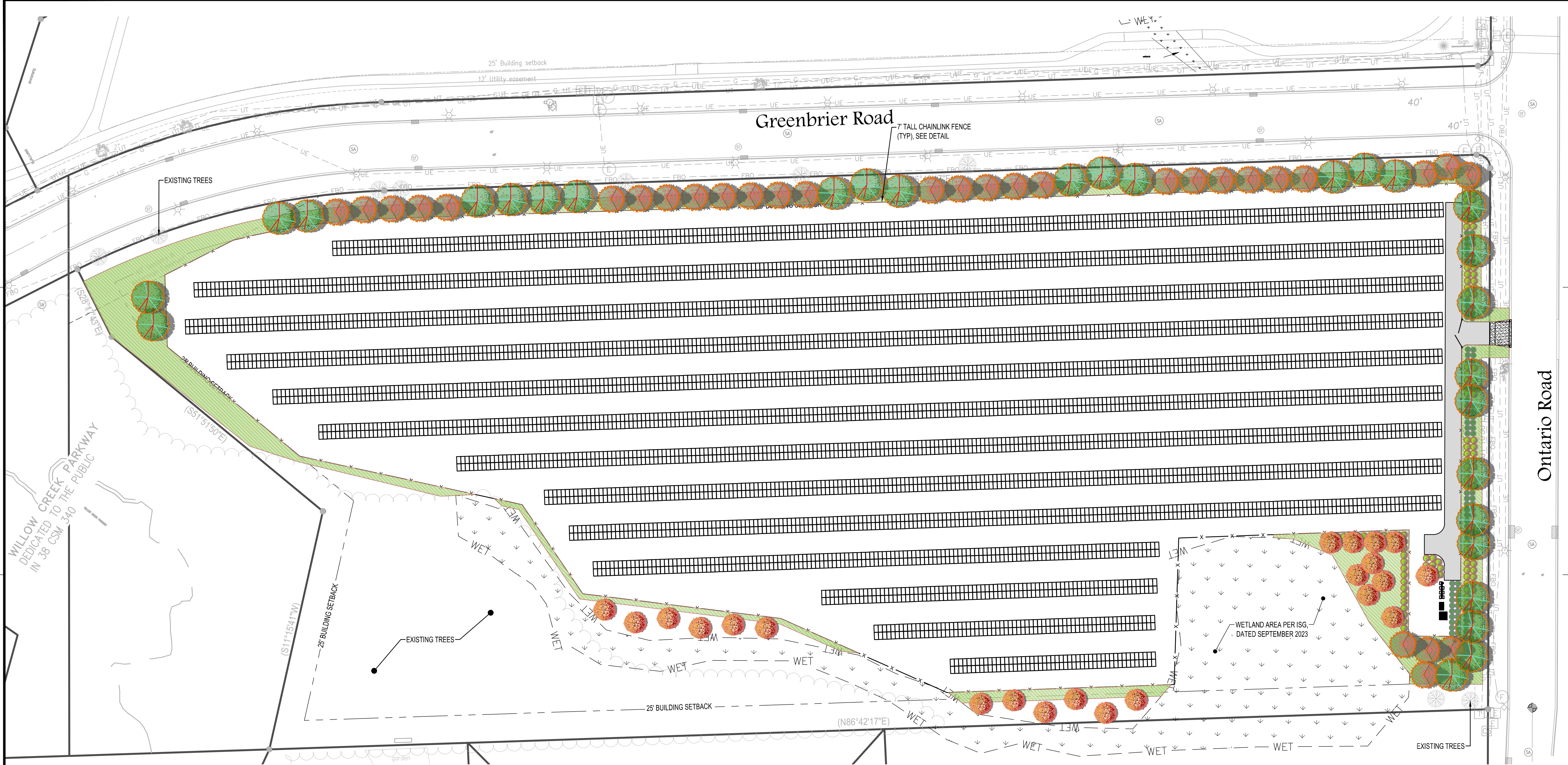
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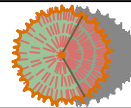
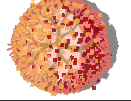
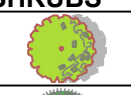
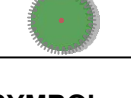




**GENERAL LANDSCAPE CODE REQUIREMENTS:**  
TOTAL = 567,892 SF (30% = 170,367 SF)  
SOLAR ARRAY DEVELOPMENT = 380,241  
TOTAL GREEN SPACE = 184,472 SF

LANDSCAPE REQUIREMENTS (BASED ON 170,367 SF):  
1 TREE / 7,000 SF = 24 TREES REQUIRED / 24 TREES PROPOSED  
3 SHRUBS / 1,000 SF = 511 SHRUBS REQUIRED / 186 SHRUBS PROPOSED AND 50  
EXISTING TREES + 58 PROPOSED TREES AS SUBSTITUTION  
• SHRUB SUBSTITUTIONS = 50 EXISTING TREES (150 SHRUBS) / 58 PROPOSED  
TREES (174 SHRUBS)  
• TOTAL SHRUBS WITH SUBSTITUTIONS = 511

TOTAL PLANTING PROPOSED:  
TREES = 24 + 58 (FOR SHRUB SUBSTITUTIONS) = 82  
SHRUBS = 186

| PLANT SCHEDULE                                                                      |                 |     |                           |
|-------------------------------------------------------------------------------------|-----------------|-----|---------------------------|
| SYMBOL                                                                              | CODE            | QTY | BOTANICAL / COMMON NAME   |
| TREES                                                                               |                 |     |                           |
|  | DT              | 29  | DECIDUOUS TREE            |
|  | ET              | 31  | EVERGREEN TREE            |
|  | UD-T            | 22  | UNDERSTORY DECIDUOUS TREE |
| SHRUBS                                                                              |                 |     |                           |
|  | DS              | 100 | DECIDUOUS SHRUB           |
|  | ES              | 87  | EVERGREEN SHRUB           |
| SYMBOL                                                                              | DESCRIPTION     |     |                           |
| GROUND COVERS                                                                       |                 |     |                           |
|  | RESTORATION MIX |     |                           |



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PROJECT

**AURORA BAYCARE  
MEDICAL CENTER**

**SOLAR ARRAY**

GREEN BAY WISCONSIN

| REVISION SCHEDULE |             |    |
|-------------------|-------------|----|
| DATE              | DESCRIPTION | BY |
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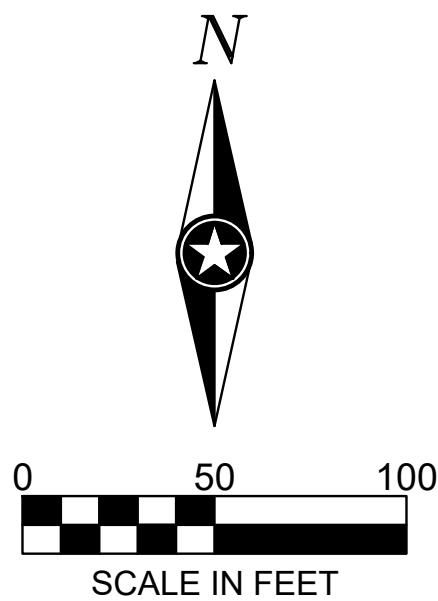
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| PROJECT NO.         | 23-29908      |
| FILE NAME           | 29908-C5-LAND |
| DRAWN BY            | TMK           |
| DESIGNED BY         | TMK           |
| REVIEWED BY         | KBR           |
| ORIGINAL ISSUE DATE | 11/1/23       |
| CLIENT PROJECT NO.  | -             |

TITLE

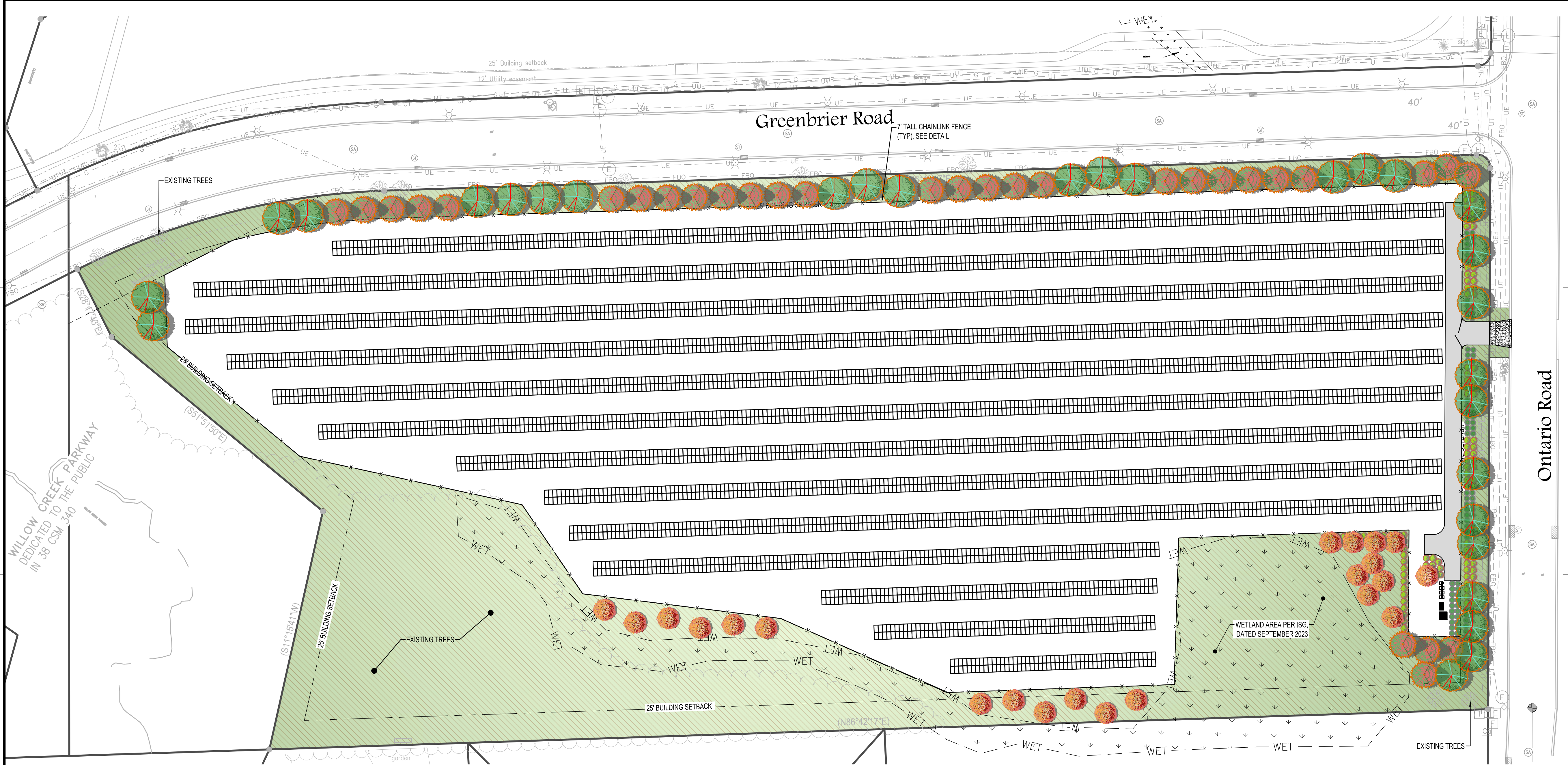
**PLANTING AND  
RESTORATION  
PLAN**

SHEET

**C5-10**







**GENERAL LANDSCAPE CODE REQUIREMENTS:**  
TOTAL = 567,892 SF (30% = 170,367 SF)  
SOLAR ARRAY DEVELOPMENT = 380,241  
TOTAL GREEN SPACE = 184,472 SF

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3 SHRUBS / 1,000 SF = 511 SHRUBS REQUIRED / 186 SHRUBS PROPOSED AND 50  
EXISTING TREES + 58 PROPOSED TREES AS SUBSTITUTION  
• SHRUB SUBSTITUTIONS = 50 EXISTING TREES (150 SHRUBS) / 58 PROPOSED  
TREES (174 SHRUBS)  
• TOTAL SHRUBS WITH SUBSTITUTIONS = 511

**TOTAL PLANTING PROPOSED:**  
TREES = 24 + 58 (FOR SHRUB SUBSTITUTIONS) = 82  
SHRUBS = 186

### PLANT SCHEDULE

| SYMBOL        | CODE | QTY             | BOTANICAL / COMMON NAME   |
|---------------|------|-----------------|---------------------------|
| TREES         |      |                 |                           |
|               | DT   | 29              | DECIDUOUS TREE            |
|               | ET   | 31              | EVERGREEN TREE            |
|               | UD-T | 22              | UNDERSTORY DECIDUOUS TREE |
| SHRUBS        |      |                 |                           |
|               | DS   | 100             | DECIDUOUS SHRUB           |
|               | ES   | 87              | EVERGREEN SHRUB           |
| SYMBOL        |      | DESCRIPTION     |                           |
| GROUND COVERS |      | RESTORATION MIX |                           |



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PROJECT

**AURORA BAYCARE  
MEDICAL CENTER**

**SOLAR ARRAY**

GREEN BAY WISCONSIN

| REVISION SCHEDULE |             |    |
|-------------------|-------------|----|
| DATE              | DESCRIPTION | BY |
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|---------------------|---------------|
| PROJECT NO.         | 23-29908      |
| FILE NAME           | 29908-C5-LAND |
| DRAWN BY            | TMK           |
| DESIGNED BY         | TMK           |
| REVIEWED BY         | KBR           |
| ORIGINAL ISSUE DATE | 11/1/23       |
| CLIENT PROJECT NO.  | -             |

TITLE  
**PLANTING AND  
RESTORATION  
PLAN**

SHEET  
**C5-10**

PRELIMINARY NOT FOR CONSTRUCTION PRELIMINARY NOT FOR CONSTRUCTION PRELIMINARY NOT FOR CONSTRUCTION



DECIDUOUS TREES



SKYLINE HONEYLOCUST | *Gleditsia triacanthos f. inermis 'Skycole'*



ESPRESSO KENTUCKY COFFEETREE  
*Gymnocladus dioicus 'Espresso'*



PRINCETON AMERICAN ELM  
*Ulmus americana 'Princeton'*

UNDERSTORY DECIDUOUS TREES



AMUR MAACKIA  
*Maackia amurensis*



DOWNY SERVICEBERRY  
*Amelanchier arborea*

EVERGREEN TREES



BALSAM FIR  
*Abies balsamea*



AMERICAN TAMARCK  
*Larix laricina*

DECIDUOUS SHRUBS



SMOOTH SUMAC  
*Rhus glabra*



BLACK CHOCKEBERRY  
*Aronia melanocarpa*



RED OISER DOGWOOD  
*Cornus serciea*

EVERGREEN SHRUBS



TECHNY GLOBE ARBORVITAE  
*Thuja occidentalis 'Techny Globe'*



CANADIAN YEW  
*Taxus canadensis*



COMMON JUNIPER  
*Juniper communis*

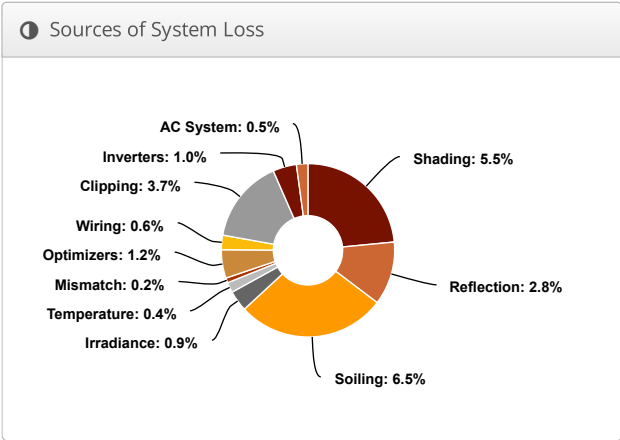
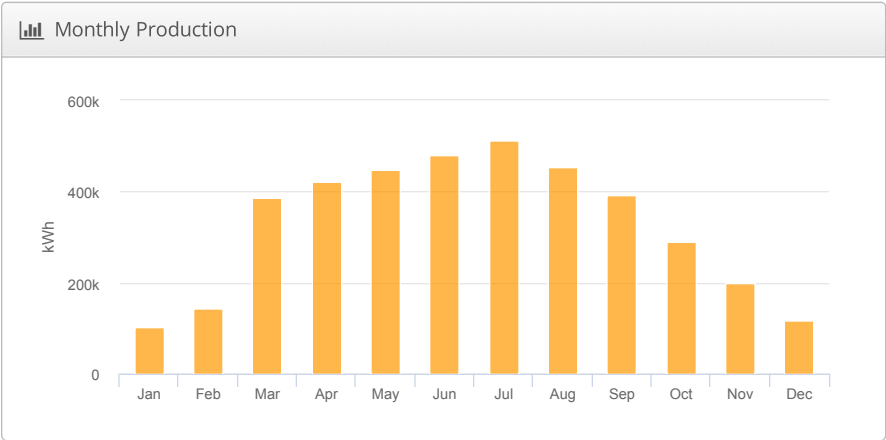
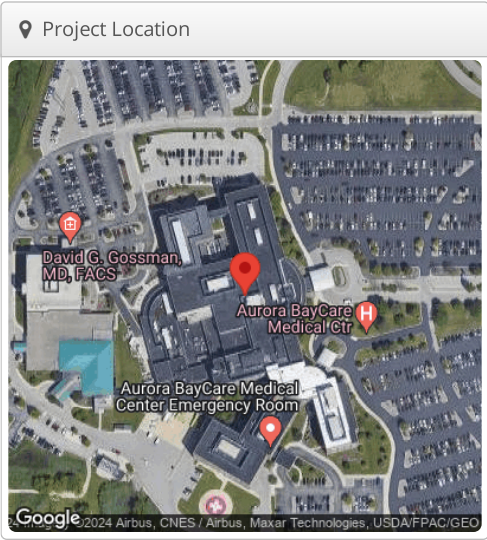
PLANT MATERIALS PALETTE



8.2 Fixed (575W) Aurora Hospital, 2845 Greenbrier Rd, Green Bay, WI 54311

| Report          |                                             |
|-----------------|---------------------------------------------|
| Project Name    | Aurora Hospital                             |
| Project Address | 2845 Greenbrier Rd, Green Bay, WI 54311     |
| Prepared By     | Luke Schaaf<br>luke.schaaf@faithtechinc.com |

| System Metrics        |                                                  |
|-----------------------|--------------------------------------------------|
| Design                | 8.2 Fixed (575W)                                 |
| Module DC Nameplate   | 3.11 MW                                          |
| Inverter AC Nameplate | 2.31 MW<br>Load Ratio: 1.35                      |
| Annual Production     | 3.940 GWh                                        |
| Performance Ratio     | 78.8%                                            |
| kWh/kWp               | 1,266.6                                          |
| Weather Dataset       | TMY, 10km Grid (44.45,-87.95), NREL (prospector) |
| Simulator Version     | 920d59ff00-5ea0439a68-28a401fc97-00422543b9      |

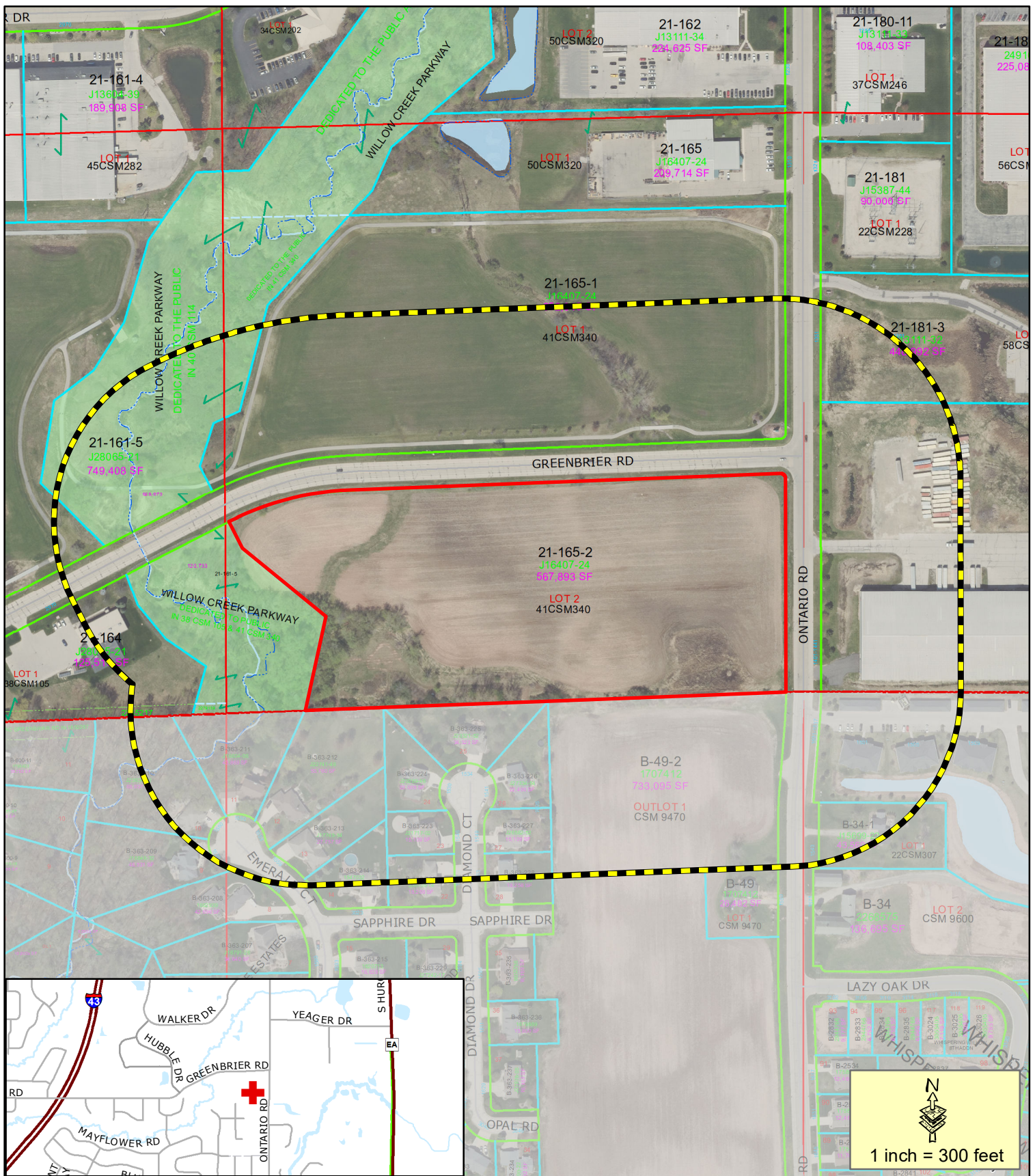




Detailed Layout







- Proposed CUP location
- 400' Property Owner Notice

This is a compilation of records and data located in various City of Green Bay offices and is to be used for reference purposes only. The City of Green Bay is not responsible for any inaccuracies or unauthorized use of the information contained within. No warranties are implied.  
Map prepared by DB

## Zoning Petition (ZP 24-05) Proposed Conditional Use Permit (CUP) at Southwest Corner of Ontario Rd & Greenbrier Rd (parcel 21-165-2)





**RESOLUTION AUTHORIZING CONDITIONAL USE  
PERMIT AT THE SOUTHWEST CORNER OF  
GREENBRIER ROAD AND ONTARIO ROAD / PARCEL # 21-165-2  
(ZP 24-05)**

**March 19, 2024**

BY THE COMMON COUNCIL OF THE CITY OF GREEN BAY, RESOLVED:

That, pursuant to Zoning Petition 24-05 and the recommendation of the Plan Commission on March 15, 2024, the City of Green Bay does authorize a Conditional Use Permit (CUP) for the establishment of a solar energy farm on the following described property located at the southwest corner of Greenbrier Road and Ontario Road (# 21-165-2), Brian Rasmussen of Aurora BayCare Medical Center on behalf of BayCare Aurora LLC, property owner.

LOT 2, VOLUME 41 CERTIFIED SURVEY MAPS, PAGE 340, MAP NO. 6285; SAID MAP BEING PART OF THE SOUTHWEST  $\frac{1}{4}$  OF THE SOUTHEAST  $\frac{1}{4}$  AND THE SOUTHEAST  $\frac{1}{4}$  OF THE SOUTHEAST  $\frac{1}{4}$ , SECTION 10, TOWNSHIP 23 NORTH, RANGE 21 EAST, IN THE CITY OF GREEN BAY, EAST SIDE OF FOX RIVER, BROWN COUNTY, WISCONSIN.

TAX PARCEL NO. 21-165-2

Said conditional-use permit shall be granted subject to:

1. Compliance with all other regulations of the Green Bay Municipal Code.
2. Exterior landscaping be located between the fence and the right-of-way, as proposed
3. Fences fabric surround/wrap be an earthtone color
4. The fence around the mechanical units along Ontario Road be 100% solid vinyl so the mechanicals are not visible from the right-of-way
5. All panels are stationary and non-glare style.

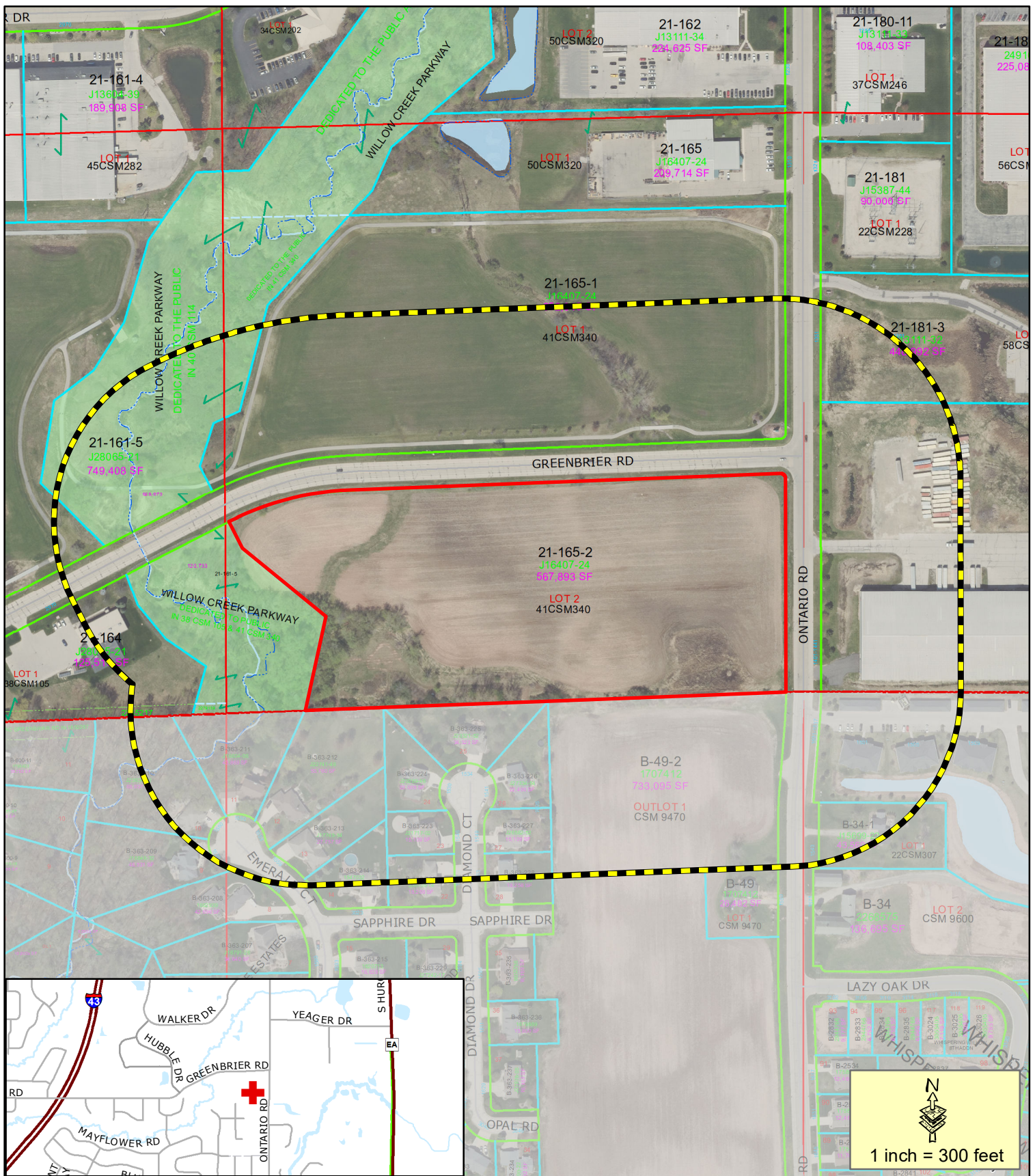
Adopted \_\_\_\_\_

Approved \_\_\_\_\_

\_\_\_\_\_  
Eric Genrich, Mayor

\_\_\_\_\_  
Celestine Jeffreys, Clerk





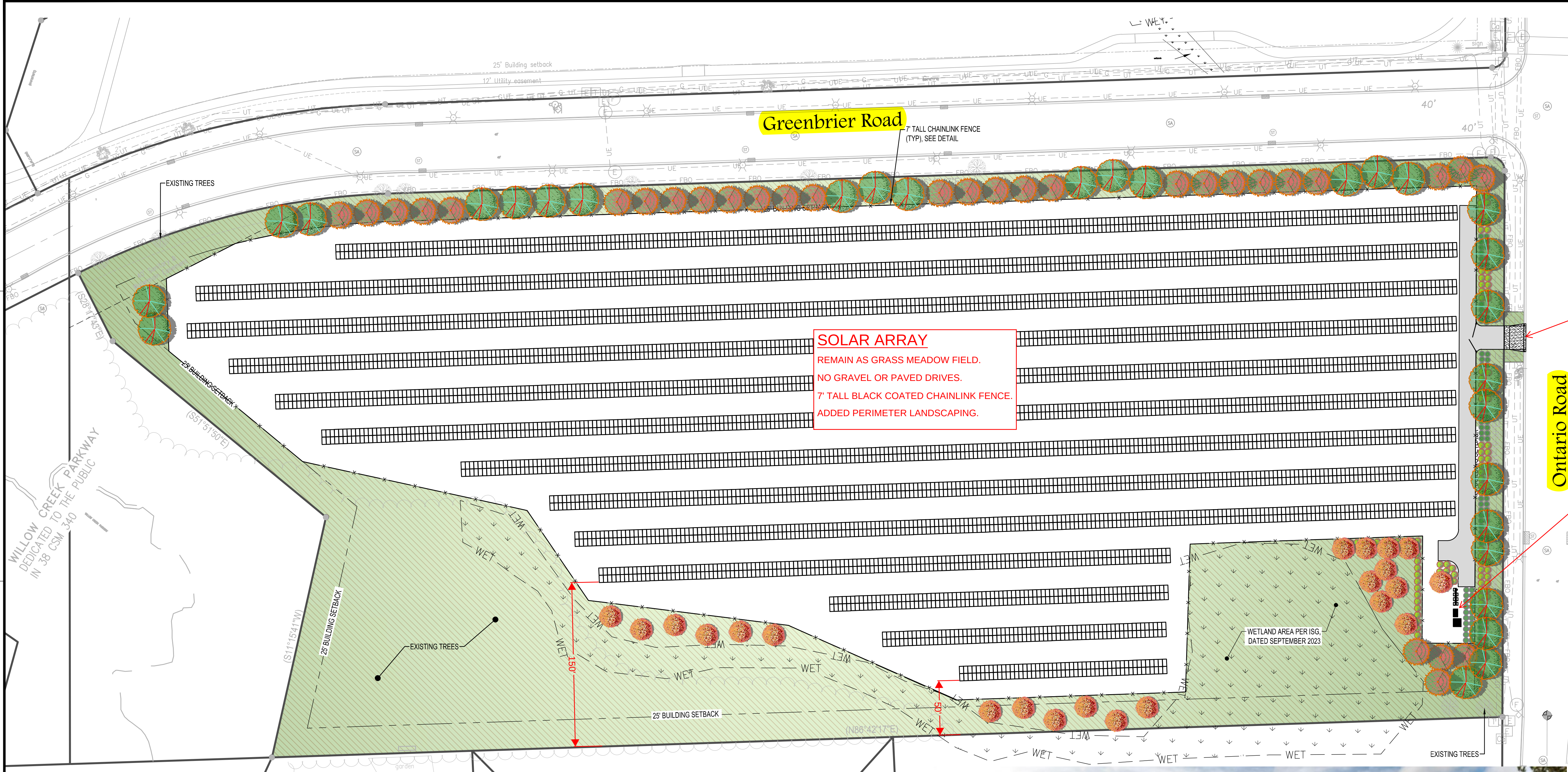
- Proposed CUP location
- 400' Property Owner Notice

This is a compilation of records and data located in various City of Green Bay offices and is to be used for reference purposes only. The City of Green Bay is not responsible for any inaccuracies or unauthorized use of the information contained within. No warranties are implied.  
Map prepared by DB

## Zoning Petition (ZP 24-05) Proposed Conditional Use Permit (CUP) at Southwest Corner of Ontario Rd & Greenbrier Rd (parcel 21-165-2)







DRIVEWAY FOR  
MAINTENANCE  
VEHICLES

PROPOSED TRANSFORMER,  
DISTRIBUTOR AND METERING  
EQUIPMENT

SHEET NOT VALID UNLESS THIS TEXT IS COLOR.

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WITHOUT PRIOR WRITTEN CONSENT.

PROJECT

**AURORA BAYCARE  
MEDICAL CENTER**

**SOLAR ARRAY**

GREEN BAY WISCONSIN

| REVISION SCHEDULE |             |    |
|-------------------|-------------|----|
| DATE              | DESCRIPTION | BY |
|                   |             |    |
|                   |             |    |
|                   |             |    |
|                   |             |    |
|                   |             |    |
|                   |             |    |

|                     |               |
|---------------------|---------------|
| PROJECT NO.         | 23-29908      |
| FILE NAME           | 29908-C5-LAND |
| DRAWN BY            | TMK           |
| DESIGNED BY         | TMK           |
| REVIEWED BY         | KBR           |
| ORIGINAL ISSUE DATE | 11/1/23       |
| CLIENT PROJECT NO.  | -             |

TITLE  
**PLANTING AND  
RESTORATION  
PLAN**

SHEET  
**C5-10**

**GENERAL LANDSCAPE CODE REQUIREMENTS:**

TOTAL = 567,882 SF (30% = 170,367 SF)  
SOLAR ARRAY DEVELOPMENT = 380,241  
TOTAL GREEN SPACE = 184,472 SF

**LANDSCAPE REQUIREMENTS (BASED ON 170,367 SF):**

- 1 TREE / 7,000 SF = 24 TREES REQUIRED / 24 TREES PROPOSED
- 3 SHRUBS / 1,000 SF = 511 SHRUBS REQUIRED / 186 SHRUBS PROPOSED AND 50 EXISTING TREES + 58 PROPOSED TREES AS SUBSTITUTION
- SHRUB SUBSTITUTIONS = 50 EXISTING TREES (150 SHRUBS) / 58 PROPOSED TREES (174 SHRUBS)
- TOTAL SHRUBS WITH SUBSTITUTIONS = 511

TOTAL PLANTING PROPOSED:  
TREES = 24 + 58 (FOR SHRUB SUBSTITUTIONS) = 82  
SHRUBS = 186

**PLANT SCHEDULE**

| SYMBOL        | CODE          | QTY             | BOTANICAL / COMMON NAME   |
|---------------|---------------|-----------------|---------------------------|
| <b>TREES</b>  |               |                 |                           |
|               | DT            | 29              | DECIDUOUS TREE            |
|               | ET            | 31              | EVERGREEN TREE            |
|               | UD-T          | 22              | UNDERSTORY DECIDUOUS TREE |
| <b>SHRUBS</b> |               |                 |                           |
|               | DS            | 100             | DECIDUOUS SHRUB           |
|               | ES            | 87              | EVERGREEN SHRUB           |
|               | SYMBOL        | DESCRIPTION     |                           |
|               | GROUND COVERS | RESTORATION MIX |                           |



PANELS WILL STAND APPROX. 20' TALL.





finishing materials for the Business Related Retail District.

**Mechanical Equipment:** All mechanical equipment, including roof-mounted, shall be enclosed or screened as part of the overall architectural design.

### **Light Manufacturing (District M)**

**Purpose:** The most general development area of the Interstate 43 Business Center which allows many types of business and light manufacturing firms.

**Permitted Uses:** These areas allow the following types of development:

1. Anything allowed in the Exclusive Office Districts.
2. Agriculture landscape counseling planning (0781).
3. Lawn and garden services (0782).
4. Construction:
  - a. Non-residential building construction (154)
  - b. Plumbing, heating and air conditioning (171)
  - c. Painting, paper hanging, and decorating (construction) (172)
  - d. Electrical work (construction) (173)
  - e. Masonry, stonework, tile setting and plastering (construction) (174)
  - f. Carpentry and floor work (construction) (175)
  - g. Roofing, siding, and sheet metal work (construction) (176)
  - h. Concrete work (construction) (177)
  - i. Water well drilling (construction) (178)
  - j. Miscellaneous special trade contractors (construction) (179) (per DRT review)
5. Manufacturing:
  - a. Dairy products (202)
  - b. Frozen specialties (2038)
  - c. Prepared flour mixes and doughs (2045)
  - d. Candy and other confectionery products (2064)
  - e. Beverages (208)
  - f. Miscellaneous food preparation and kindred products (209) (per DRT review)
  - g. Broad woven fabric mills, cotton (221)
  - h. Broad woven fabric mills, manmade fiber (222)
  - i. Broad woven fabric mills, wool (223)
  - j. Narrow fabrics and other small ware mills; cotton, wood, silk and manmade fabric (224)
  - k. Knitting mills (225)
  - l. Textile finishing, except wool (226)



- m. Carpets and rugs (227)
- n. Yarn and thread mills (228)
- o. Miscellaneous textile goods (229)
- p. Men's and boy's suites, coats, and overcoats (231)
- q. Men's and boy's furnishings (232)
- r. Women's and misses' outerwear (233)
- s. Women's and children's undergarments (234)
- t. Hats, caps and millinery (235)
- u. Girls' and children's outerwear (236)
- v. Fur goods (237)
- w. Miscellaneous apparel and accessories (238)
- x. Miscellaneous fabricated textile products (239)
- y. Millwork (2431) (per DRT review)
- z. Wood kitchen
- aa. Miscellaneous wood products (249) (per DRT review)
- bb. Household furniture (251)
- cc. Office furniture (252)
- dd. Public building and related furniture (253)
- ee. Partitions, shelving, lockers and office and store fixtures (254)
- ff. Miscellaneous furniture and fixtures (259)
- gg. Paperboard containers and boxes (265)
- hh. Converted paper and paperboard products, except containers and boxes (267)
- ii. Newspapers: publishing, publishing and printing (271)
- jj. Periodicals: publishing, publishing and printing (272)
- kk. Books (273)
- ll. Miscellaneous publishing (274)
- mm. Commercial printing (275)
- nn. Manifold business forms (276)
- oo. Greeting cards publishing (277)
- pp. Blank books, loose-leaf binders and book binding and related work (278)
- qq. Service industries for the printing trade (279)
- rr. Drugs (283)
- ss. Miscellaneous plastic products (308) (per DRT review)
- tt. Footwear cut stock (313)
- uu. Footwear, except rubber (314)
- vv. Leather gloves and mittens (315)
- ww. Luggage (316)
- xx. Handbags and other personal leather goods (317)
- yy. Leather goods, not elsewhere classified (319)
- zz. Glass products of purchased glass (323)
- aaa. Metal cans and shipping containers (341)
- bbb. Cutlery, hand tools and general hardware (342) (per DRT review)
- ccc. Plumbing and heating, except electric (343)
- ddd. Metal doors, sash, and trim (3442)
- eee. Sheet metal work (3444)
- fff. Screw machine products and bolts, nuts and screws, rivets and washers (345)



- ggg. Metal services, not elsewhere classified (347) (per DRT review)
- hhh. Ordinance and accessories, not elsewhere classified (348)
- iii. Lawn and garden equipment (3524)
- jjj. Metal working machinery (354)
- kkk. Special industry machinery (355)
- lll. Computer and office equipment (357)
- mmm. Refrigeration and service machinery (358)
- nnn. Miscellaneous machinery (359)
- ooo. Electrical distribution equipment (361)
- ppp. Electrical industrial apparatus (362)
- qqq. Household appliances (363)
- rrr. Electric lighting and wiring equipment (364)
- sss. Household audio and video equipment (365)
- ttt. Communications equipment (366)
- uuu. Electronic components and accessories (367)
- vvv. Miscellaneous electrical equipment and supplies (369)
- www. Aircraft parts and equipment (3728)
- xxx. Motorcycles, bicycles, and parts (375)
- yyy. Guided missiles and space vehicles and parts (376)
- zzz. Miscellaneous transportation equipment (379) (per DRT and Plan Commission review)
- aaaa. Search and navigation equipment (381)
- bbbb. Measuring and controlling devices (382)
- cccc. Surgical, medical and dental instruments and supplies (384)
- dddd. Ophthalmic goods (385)
- eeee. Photographic equipment and supplies (386)
- ffff. Watches, clocks, clockwork operated devices and parts (387)
- gggg. Jewelry, silverware and plated wire (391)
- hhhh. Musical instruments (393)
- iiii. Toys and sporting goods (394)
- jjjj. Pens, pencils, office and art supplies (395)
- kkkk. Costume jewelry, costume novelties, buttons, and miscellaneous manufacturing (399) (per DRT and Plan Commission review)

5. Transportation, communication, electric, gas and sanitary services:

- a. Courier services, except by air (4215)
- b. Public warehousing and storage (422) (excluding “mini-warehousing” and self storage)
- c. U.S. Postal Service (431)
- d. Freight transportation arrangement (473)
- e. Miscellaneous transportation services (478)
- f. Telegraph communication (wire or radio) (482)
- g. Radio and television broadcasting (483)
- h. Communications services, not elsewhere classified (489)



6. Wholesale trade:

- a. Motor vehicle parts and supplies (501)
- b. Furniture and home furnishings (502)
- c. Lumber and construction materials (503)
- d. Professional and commercial equipment (504)
- e. Metals and minerals, except petroleum (505)
- f. Electrical goods (506)
- g. Hardware, plumbing and heating equipment (507)
- h. Machinery, equipment and supplies (508)
- i. Miscellaneous durable goods (509)
- j. Paper and paper products (511)
- k. Drugs, proprietaries, and sundries (512)
- l. Apparel, piece goods, and notions (5130)
- m. Groceries and related products (514)
- n. Chemicals and allied products (516) (per DRT review )
- o. Beer, wine and distilled beverages (518)
- p. Miscellaneous non-durable goods (519) (per DRT review)
- q. Catalog and mail order houses (5961)

7. Services:

- a. Laundry, cleaning, and garment services (721), excluding (7211) power laundries, family and commercial, (7215) coin-operated laundries and dry cleaning
- b. Service buildings (734)
- c. Miscellaneous business service (7389)
- d. Electrical repair shops (762)
- e. Miscellaneous repair shops and related services (769)
- f. Motion picture production and services (781) (per DRT review)
- g. Physical fitness facilities (7991)

8. Public administration:

- a. Space research and technology (966)

9. Conditional Use

Parcels within the Light Manufacturing District limited to their frontage on the east side of Huron Road, between the future East Mason Street and the southern limits of the I-43 Business Center, may be allowed as a conditional use permit for the following uses and conditions: (Z.O. 7-02)

- 1. Retail assembly, sales and repair establishments with the review and approval of the DRT.
- 2. Health clubs.
- 3. Job training and related services.
- 4. Businesses where the storage of goods is limited to interior storage of manufactured goods not requiring



- any further processing and not requiring mechanical lifts, cranes, or hoists outside the building for handling, loading, and unloading.
5. Financial institutions.
  6. The outdoor display of vehicles is prohibited.
  7. Other uses as allowed by the Plan Commission.
  8. Accessory buildings and uses customarily incidental to any of the above structures or uses when located on the same premises shall complement and coordinate with the principal structure on the lot, both in material used and architectural style.

**Buildings Facades.** Colors, materials, finishes, and building forms shall be coordinated in a consistent manner on all facades. All exterior walls shall be finished with the following materials:

1. 100% masonry on all exterior walls. Brick or natural stone (exterior use of brick, masonry, and man-made or natural stone which does not require a foundation generally is not permitted, DRT review and approval required).
2. Decorative face concrete block, concrete panels.
3. Architectural metal roof or accent only (minimum 20-year warranty on finish; at least 26 gauge metal, totally concealed fasteners, baseplates, and end trim required).
4. Painted concrete, cinder block, or prefabricated sheet metal are not permitted finishing materials.
5. Other materials as approved by the DRT.

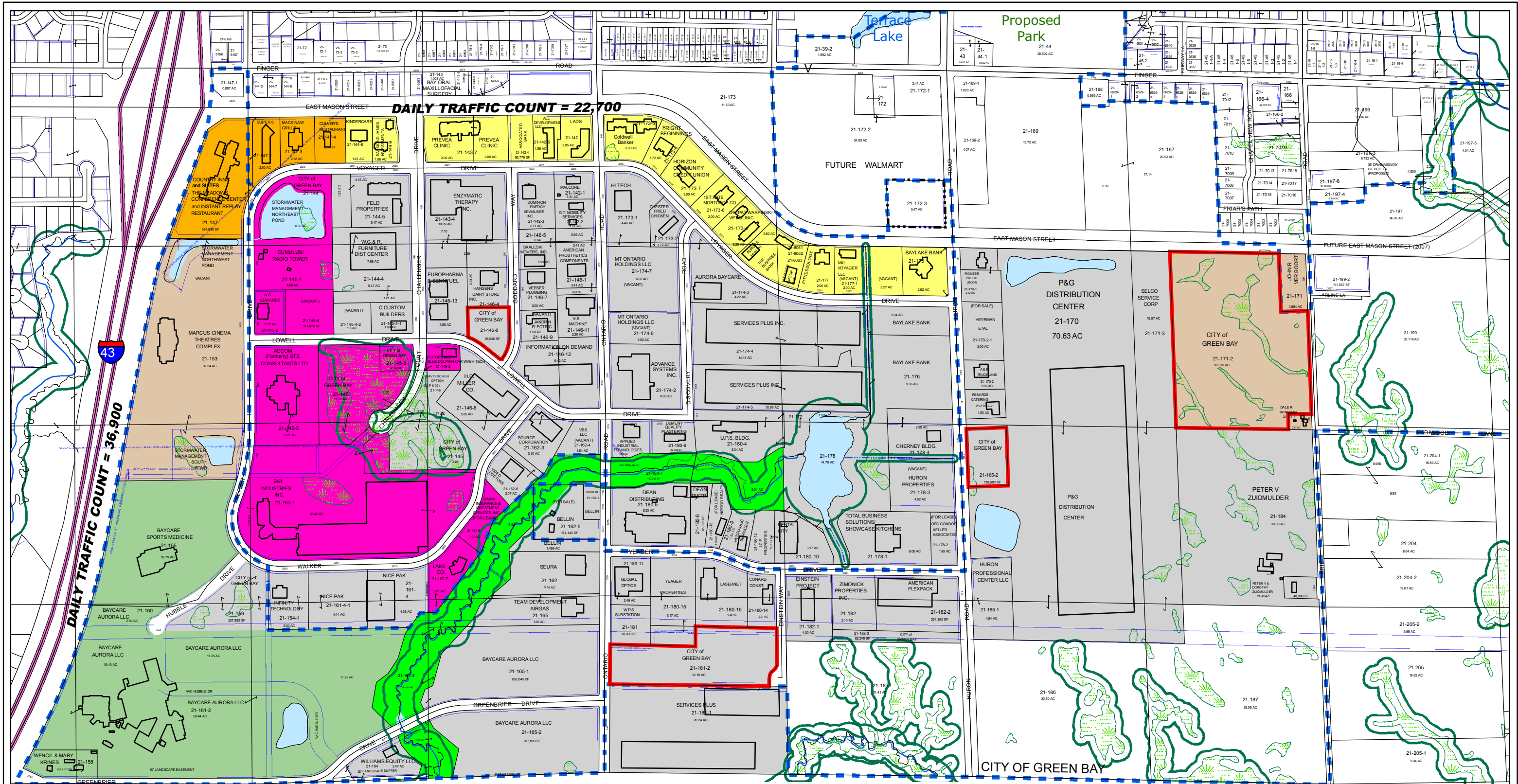
**Setbacks.** Consistent with Business-Related Retail District of the I-43 Business Center Design Criteria.

**Required Plans.** A preliminary site plan shall be accompanied by architectural plans and elevations of sufficient detail to show conformance with these Design Standards.

**Refuse Containers.** Refuse containers shall only be located in the rear or interior side of the building. All refuse containers shall be screened not less than the height of the containers and have gates to contain trash. Shared dumpsters with adjacent properties are encouraged.

**Mechanical Equipment.** Ground-based mechanical equipment shall only be located in the rear or interior side of the building. All ground-based mechanical equipment shall be screened from public view. All roof-mounted mechanical equipment shall be screen from public view by the roof structure itself, parapet walls or other screening element that blends with and complements the architecture and materials of the building.





# CITY of GREEN BAY I-43 BUSINESS CENTER

I-43 BUSINESS CENTER BOUNDARY

TID 12 LINE

BUILDING

EASEMENT

ENVIRONMENTALLY SENSITIVE AREA

WETLAND

CITY OWNED PROPERTY FOR SALE

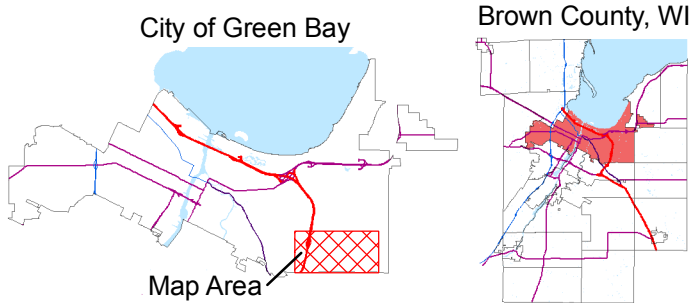
MITIGATION AREA (7.71 AC.)

NAVIGABLE STREAM/

N

350 175 0 350 700 Feet

| ZONING                  | DEVELOPED ACRES | UNDEVELOPED ACRES | DEVELOPED PERCENT | UNDEVELOPED PERCENT | LAND USE DISTRIBUTION % | TOTAL ACRES |
|-------------------------|-----------------|-------------------|-------------------|---------------------|-------------------------|-------------|
| Light Manufacturing     | 347.41          | 110.15            | 76%               | 24%                 | 61%                     | 457.56      |
| Executive Office A      | 63.66           | 18.79             | 77%               | 23%                 | 11%                     | 82.45       |
| Executive Office B      | 58.86           | 9.44              | 86%               | 14%                 | 9%                      | 68.30       |
| Entertainment District  | 9.83            | 53.23             | 16%               | 84%                 | 8%                      | 63.06       |
| Business Related Retail | 32.91           | 5.11              | 87%               | 13%                 | 5%                      | 38.02       |
| Conservancy             | 26.373          | -                 | 100%              | 0%                  | 4%                      | 26.37       |
| Lodging                 | 13.44           | 1.87              | 88%               | 12%                 | 2%                      | 15.30       |
| Total                   | 552.47          | 198.60            | 74%               | 26%                 | 100%                    | 751.06      |





MARCH 5, 2024

Brian Rasmussen, Aurora BayCare Medical Center  
Director of Support Services  
2845 Greenbrier Road, Green Bay, WI 54311  
(920) 288-4024  
[Brian.rasmussen@aah.org](mailto:Brian.rasmussen@aah.org)



Tom Katers, ISG  
Senior Civil Designer  
115 E. Pine Street, Green Bay, WI 54301  
(920) 434-2128  
[Tom.katers@isginc.com](mailto:Tom.katers@isginc.com)

---

RE: AURORA BAYCARE MEDICAL CENTER SOLAR ARRAY,  
GREEN BAY, WISCONSIN

Dear neighbor,

Aurora BayCare Medical Center (ABMC) seeks to construct a Solar Array at their east Green Bay campus, on one of their open, undeveloped parcels. ABMC strives to improve their sustainability and reduction in reliance on electricity as they continue to grow and evolve with world challenges.

From Aurora BayCare's Director of Support Services, Brian Rasmussen, "We are requesting the approval of a solar ground mount project at 3099 Greenbrier Road in Green Bay. We are looking to install this system so we can meet our long-term site energy goals while providing a reduced carbon footprint to our current energy model. The project will also align with our commitment to our community and our investment of sustaining our campus needs for many years into the future."

Please see our proposed plan enclosed.

If you are interested in discussing this project further, please do not hesitate to reach out to myself or Brian.

Sincerely,

A handwritten signature in black ink that reads "Thomas M. Katers".

Thomas M. Katers  
Senior Civil Designer

[Tom.katers@isginc.com](mailto:Tom.katers@isginc.com)



**From:** [Inspection Website Mail](#)  
**To:** [Jon LeRoy](#)  
**Cc:** [David Buck](#)  
**Subject:** FW: Online Form Submittal: Comment Form for Committees and Council  
**Date:** Wednesday, March 6, 2024 3:49:08 PM

---

Megan Hein  
Development Support Specialist  
City of Green Bay  
Community & Economic Development  
920.448.3300  
[www.greenbaywi.gov](http://www.greenbaywi.gov)

---

**From:** noreply@civicplus.com <noreply@civicplus.com>  
**Sent:** Wednesday, March 6, 2024 3:27 PM  
**To:** Inspection Website Mail <InspectionWebsiteMail@greenbaywi.gov>  
**Subject:** Online Form Submittal: Comment Form for Committees and Council

## Comment Form for Committees and Council

The City of Green Bay welcomes input regarding actions of the Common Council or a Committee/Commission/Board. There are many opportunities for interested parties to speak at a public meeting. Signing this form does not obligate you to speak. If you decide to speak, please keep your comments relevant to the topic being deliberated, and also please compose your comments to last around 3 minutes. Thank you!

*Online comments will be accepted up until 1.5 hours before the meeting.*

|            |                    |
|------------|--------------------|
| First Name | Amy                |
| Last Name  | Gajeski            |
| Address    | 1549 diamond court |
| City       | Green Bay          |
| State      | WI                 |
| Zip Code   | 54311              |

(Section Break)



|                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Which Committee/Commission/Board do you have comments for? | Zoning & Planning Board of Appeals                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| What is the date of the meeting?                           | 3/15/2024                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| For which item do you wish to provide comments?            | Conditional use permit of Hwy 43 business park zoning                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| What is your opinion of the item?                          | I OPPOSE the item.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Would you like to speak at the meeting?                    | Yes, I would like to speak at the meeting.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Comments                                                   | <p>I'm not sure of the proper process of this request but I will come speak if I need to. I do not know if this is a public meeting or closed door meeting. Please advise. Aurora has applied for a Conditional use permit for the solar ground mount project at 3099 Greenbrier Road. I am NOT in favor of this permit/plan. I am a Bellevue resident with a home approximately 100-200 yards from the Green Bay city line. Putting a solar array/farm right behind a residential area in Bellevue is not ideal. I understand the request &amp; energy goals of Aurora but this is not aesthetically pleasing for the residents who reside right behind this property. These panels will be 20 feet tall. I'm concerned about looks, decrease in property value, health impacts of electromagnetic fields (EMF), humming noises &amp; impact to wildlife. I'm not sure how many people want to look out there back/side windows and see a large solar farm right behind your property. Please consider this feedback as you approve or deny this conditional use permit. Thank you.</p> |

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WHITE PAPER

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# Health and Safety Impacts of Solar Photovoltaics

By Tommy Cleveland  
May 2017





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# Health and Safety Impacts of Solar Photovoltaics

The increasing presence of utility-scale solar photovoltaic (PV) systems (sometimes referred to as solar farms) is a rather new development in North Carolina's landscape. Due to the new and unknown nature of this technology, it is natural for communities near such developments to be concerned about health and safety impacts. Unfortunately, the quick emergence of utility-scale solar has cultivated fertile grounds for myths and half-truths about the health impacts of this technology, which can lead to unnecessary fear and conflict.

Photovoltaic (PV) technologies and solar inverters are not known to pose any significant health dangers to their neighbors. The most important dangers posed are increased highway traffic during the relative short construction period and dangers posed to trespassers of contact with high voltage equipment. This latter risk is mitigated by signage and the security measures that industry uses to deter trespassing. As will be discussed in more detail below, risks of site contamination are much less than for most other industrial uses because PV technologies employ few toxic chemicals and those used are used in very small quantities. Due to the reduction in the pollution from fossil-fuel-fired electric generators, the overall impact of solar development on human health is overwhelmingly positive. This pollution reduction results from a partial replacement of fossil-fuel fired generation by emission-free PV-generated electricity, which reduces harmful sulfur dioxide (SO<sub>2</sub>), nitrogen oxides (NO<sub>x</sub>), and fine particulate matter (PM<sub>2.5</sub>). Analysis from the National Renewable Energy Laboratory and the Lawrence Berkeley National Laboratory, both affiliates of the U.S. Department of Energy, estimates the health-related air quality benefits to the southeast region from solar PV generators to be worth 8.0 ¢ per kilowatt-hour of solar generation.<sup>1</sup>

This is in addition to the value of the electricity and suggests that the air quality benefits of solar are worth more than the electricity itself.

Even though we have only recently seen large-scale installation of PV technologies, the technology and its potential impacts have been studied since the 1950s. A combination of this solar-specific research and general scientific research has led to the scientific community having a good understanding of the science behind potential health and safety impacts of solar energy. This paper utilizes the latest scientific literature and knowledge of solar practices in N.C. to address the health and safety risks associated with solar PV technology. These risks are extremely small, far less than those associated with common activities such as driving a car, and vastly outweighed by health benefits of the generation of clean electricity.

This paper addresses the potential health and safety impacts of solar PV development in North Carolina, organized into the following four categories:

- (1) Hazardous Materials
- (2) Electromagnetic Fields (EMF)
- (3) Electric Shock and Arc Flash
- (4) Fire Safety

## 1 • Hazardous Materials

One of the more common concerns towards solar is that the panels (referred to as "modules" in the solar industry) consist of toxic materials that endanger public health. However, as shown in this section, solar energy systems may contain small amounts of toxic materials, but these materials do not endanger public health. To understand potential toxic hazards coming from a solar project, one



must understand system installation, materials used, the panel end-of-life protocols, and system operation. This section will examine these aspects of a solar farm and the potential for toxicity impacts in the following subsections:

- (1.2) Project Installation/Construction
  - (1.2) System Components
    - 1.2.1 Solar Panels: Construction and Durability
    - 1.2.2 Photovoltaic technologies
      - (a) Crystalline Silicon
      - (b) Cadmium Telluride (CdTe)
      - (c) CIS/CIGS
    - 1.2.3 Panel End of Life Management
    - 1.2.4 Non-panel System Components
  - (1.3) Operations and Maintenance

## 1.1 Project Installation/Construction

The system installation, or construction, process does not require toxic chemicals or processes. The site is mechanically cleared of large vegetation, fences are constructed, and the land is surveyed to layout exact installation locations. Trenches for underground wiring are dug and support posts are driven into the ground. The solar panels are bolted to steel and aluminum support structures and wired together. Inverter pads are installed, and an inverter and transformer are installed on each pad. Once everything is connected, the system is tested, and only then turned on.



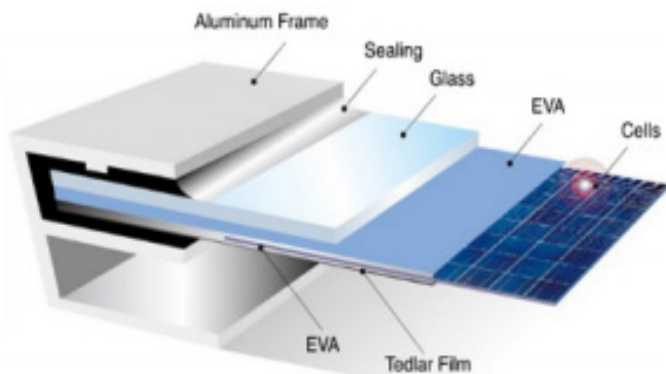
Figure 1: Utility-scale solar facility (5 MWAC) located in Catawba County. *Source: Strata Solar*

## 1.2 • System Components

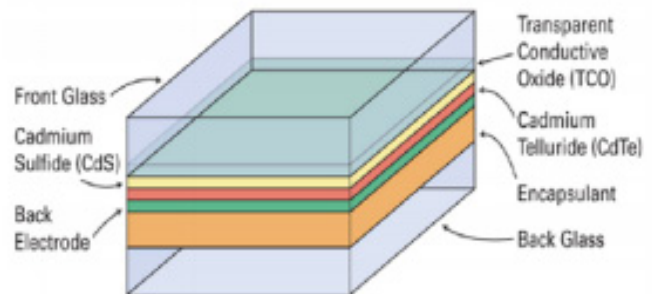
### 1.2.1 Solar Panels: Construction and Durability

Solar PV panels typically consist of glass, polymer, aluminum, copper, and semiconductor materials that can be recovered and recycled at the end of their useful life.<sup>2</sup> Today there are two PV technologies used in PV panels at utility-scale solar facilities, silicon, and thin film. As of 2016, all thin film used in North Carolina solar facilities are cadmium telluride (CdTe) panels from the US manufacturer First Solar, but there are other thin film PV panels available on the market, such as Solar Frontier's CIGS panels. Crystalline silicon technology consists of silicon wafers which are made into cells

and assembled into panels, thin film technologies consist of thin layers of semiconductor material deposited onto glass, polymer or metal substrates. While there are differences in the components and manufacturing processes of these two types of solar technologies, many aspects of their PV panel construction are very similar. Specifics about each type of PV chemistry as it relates to toxicity are covered in subsections a, b, and c in section 1.2.2; on crystalline silicon, cadmium telluride, and CIS/CIGS respectively. The rest of this section applies equally to both silicon and thin film panels.



*Figure 2: Components of crystalline silicon panels. The vast majority of silicon panels consist of a glass sheet on the topside with an aluminum frame providing structural support. Image Source: [www.riteksolar.com.tw](http://www.riteksolar.com.tw)*



*Figure 3: Layers of a common frameless thin-film panel (CdTe). Many thin film panels are frameless, including the most common thin-film panels, First Solar's CdTe. Frameless panels have protective glass on both the front and back of the panel. Layer thicknesses not to scale. Image Source: [www.homepower.com](http://www.homepower.com)*

To provide decades of corrosion-free operation, PV cells in PV panels are encapsulated from air and moisture between two layers of plastic. The encapsulation layers are protected on the top with a layer of tempered glass and on the backside with a polymer sheet. Frameless modules include a protective layer of glass on the rear of the panel, which may also be tempered. The plastic ethylene-vinyl acetate (EVA) commonly provides the

cell encapsulation. For decades, this same material has been used between layers of tempered glass to give car windshields and hurricane windows their great strength. In the same way that a car windshield cracks but stays intact, the EVA layers in PV panels keep broken panels intact (see Figure 4). Thus, a damaged module does not generally create small pieces of debris; instead, it largely remains together as one piece.





Figure 4: The mangled PV panels in this picture illustrate the nature of broken solar panels; the glass cracks but the panel is still in one piece. Image Source: [http://img.alibaba.com/photo/115259576/broken\\_solar\\_panel.jpg](http://img.alibaba.com/photo/115259576/broken_solar_panel.jpg)

PV panels constructed with the same basic components as modern panels have been installed across the globe for well over thirty years.<sup>3</sup> The long-term durability and performance demonstrated over these decades, as well as the results of accelerated lifetime testing, helped lead to an industry standard 25-year power production warranty for PV panels. These power warranties warrant a PV panel to produce at least 80% of their original nameplate production after 25 years of use. A recent SolarCity and DNV GL study reported that today's quality PV panels should be expected to reliably and efficiently produce power for thirty-five years.<sup>4</sup>

Local building codes require all structures, including ground mounted solar arrays, to be engineered to withstand anticipated wind speeds, as defined by the local wind speed requirements. Many rack-

ing products are available in versions engineered for wind speeds of up to 150 miles per hour, which is significantly higher than the wind speed requirement anywhere in North Carolina. The strength of PV mounting structures were demonstrated during Hurricane Sandy in 2012 and again during Hurricane Matthew in 2016. During Hurricane Sandy, the many large-scale solar facilities in New Jersey and New York at that time suffered only minor damage.<sup>5</sup> In the fall of 2016, the US and Caribbean experienced destructive winds and torrential rains from Hurricane Matthew, yet one leading solar tracker manufacturer reported that their numerous systems in the impacted area received zero damage from wind or flooding.<sup>6</sup>

In the event of a catastrophic event capable of damaging solar equipment, such as a tornado, the system will almost certainly have property insurance

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that will cover the cost to cleanup and repair the project. It is in the best interest of the system owner to protect their investment against such risks. It is also in their interest to get the project repaired and producing full power as soon as possible. Therefore, the investment in adequate insurance is a wise business practice for the system owner. For the same reasons, adequate insurance coverage is also generally a requirement of the bank or firm providing financing for the project.

## 1.2.2 Photovoltaic (PV) Technologies

### a. Crystalline Silicon

This subsection explores the toxicity of silicon-based PV panels and concludes that they do not pose a material risk of toxicity to public health and safety. Modern crystalline silicon PV panels, which account for over 90% of solar PV panels installed today, are, more or less, a commodity product. The overwhelming majority of panels installed in North Carolina are crystalline silicon panels that are informally classified as Tier I panels. Tier I panels are from well-respected manufacturers that have a good chance of being able to honor warranty claims. Tier I panels are understood to be of high quality, with predictable performance, durability, and content. Well over 80% (by weight) of the content of a PV panel is the tempered glass front and the aluminum frame, both of which are common building materials. Most of the remaining portion are common plastics, including polyethylene terephthalate in the backsheet, EVA encapsulation of the PV cells, polyphenyl ether in the junction box, and polyethylene insulation on the wire leads. The active, working components of the system are the silicon photovoltaic cells, the small electrical leads connecting them together, and to the wires coming out of the back of the panel. The electricity generating and conducting components makeup less than 5% of the weight

of most panels. The PV cell itself is nearly 100% silicon, and silicon is the second most common element in the Earth's crust. The silicon for PV cells is obtained by high-temperature processing of quartz sand ( $\text{SiO}_2$ ) that removes its oxygen molecules. The refined silicon is converted to a PV cell by adding extremely small amounts of boron and phosphorus, both of which are common and of very low toxicity.

The other minor components of the PV cell are also generally benign; however, some contain lead, which is a human toxicant that is particularly harmful to young children. The minor components include an extremely thin antireflective coating (silicon nitride or titanium dioxide), a thin layer of aluminum on the rear, and thin strips of silver alloy that are screen-printed on the front and rear of cell.<sup>7</sup> In order for the front and rear electrodes to make effective electrical contact with the proper layer of the PV cell, other materials (called glass frit) are mixed with the silver alloy and then heated to etch the metals into the cell. This glass frit historically contains a small amount of lead (Pb) in the form of lead oxide. The 60 or 72 PV cells in a PV panel are connected by soldering thin solder-covered copper tabs from the back of one cell to the front of the next cell. Traditionally a tin-based solder containing some lead (Pb) is used, but some manufacturers have switched to lead-free solder. The glass frit and/or the solder may contain trace amounts of other metals, potentially including some with human toxicity such as cadmium. However, testing to simulate the potential for leaching from broken panels, which is discussed in more detail below, did not find a potential toxicity threat from these trace elements. Therefore, the tiny amount of lead in the glass frit and the solder is the only part of silicon PV panels with a potential to create a negative health impact. However, as described below, the very limited amount of lead involved and its strong physical and chemical attachment to other components of the PV panel means that even in worst-case scenarios the health hazard it poses is insignificant.



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As with many electronic industries, the solder in silicon PV panels has historically been a lead-based solder, often 36% lead, due to the superior properties of such solder. However, recent advances in lead-free solders have spurred a trend among PV panel manufacturers to reduce or remove the lead in their panels. According to the 2015 Solar Scorecard from the Silicon Valley Toxics Coalition, a group that tracks environmental responsibility of photovoltaic panel manufacturers, fourteen companies (increased from twelve companies in 2014) manufacture PV panels certified to meet the European Restriction of Hazardous Substances (RoHS) standard. This means that the amount of cadmium and lead in the panels they manufacture fall below the RoHS thresholds, which are set by the European Union and serve as the world's de facto standard for hazardous substances in manufactured goods.<sup>8</sup> The Restriction of Hazardous Substances (RoHS) standard requires that the maximum concentration found in any homogeneous material in a product is less than 0.01% cadmium and less than 0.10% lead, therefore, any solder can be no more than 0.10% lead.<sup>9</sup>

While some manufacturers are producing PV panels that meet the RoHS standard, there is no requirement that they do so because the RoHS Directive explicitly states that the directive does not apply to photovoltaic panels.<sup>10</sup> The justification for this is provided in item 17 of the current RoHS Directive: "The development of renewable forms of energy is one of the Union's key objectives, and the contribution made by renewable energy sources to environmental and climate objectives is crucial. Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources (4) recalls that there should be coherence between those objectives and other Union environmental legislation. Consequently, this Directive should not prevent the development of renewable energy technologies that have no negative impact on health and the environment and that are sustainable and economically viable."

The use of lead is common in our modern economy. However, only about 0.5% of the annual lead consumption in the U.S. is for electronic solder for all uses; PV solder makes up only a tiny portion of this 0.5%. Close to 90% of lead consumption in the US is in batteries, which do not encapsulate the pounds of lead contained in each typical automotive battery. This puts the lead in batteries at great risk of leaching into the environment. Estimates for the lead in a single PV panel with lead-based solder range from 1.6 to 24 grams of lead, with 13g (less than half of an ounce) per panel seen most often in the literature.<sup>11</sup> At 13 g/panel<sup>12</sup>, each panel contains one-half of the lead in a typical 12-gauge shotgun shell. This amount equates to roughly 1/750th of the lead in a single car battery. In a panel, it is all durably encapsulated from air or water for the full life of the panel.<sup>14</sup>

As indicated by their 20 to 30-year power warranty, PV modules are designed for a long service life, generally over 25 years. For a panel to comply with its 25-year power warranty, its internal components, including lead, must be sealed from any moisture. Otherwise, they would corrode and the panel's output would fall below power warranty levels. Thus, the lead in operating PV modules is not at risk of release to the environment during their service lifetime. In extreme experiments, researchers have shown that lead can leach from crushed or pulverized panels.<sup>15, 16</sup> However, more real-world tests designed to represent typical trash compaction that are used to classify waste as hazardous or non-hazardous show no danger from leaching.<sup>17,18</sup> For more information about PV panel end-of-life, see the Panel Disposal section.

As illustrated throughout this section, silicon-based PV panels do not pose a material threat to public health and safety. The only aspect of the panels with potential toxicity concerns is the very small amount of lead in some panels. However, any lead in a panel is well sealed from environmental exposure for the operating lifetime of the solar panel and thus not at risk of release into the environment.

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## b. Cadmium Telluride (CdTe) PV Panels

This subsection examines the components of a cadmium telluride (CdTe) PV panel. Research demonstrates that they pose negligible toxicity risk to public health and safety while significantly reducing the public's exposure to cadmium by reducing coal emissions. As of mid-2016, a few hundred MWs of cadmium telluride (CdTe) panels, all manufactured by the U.S. company First Solar, have been installed in North Carolina.

Questions about the potential health and environmental impacts from the use of this PV technology are related to the concern that these panels contain cadmium, a toxic heavy metal. However, scientific studies have shown that cadmium telluride differs from cadmium due to its high chemical and thermal stability.<sup>19</sup> Research has shown that the tiny amount of cadmium in these panels does not pose a health or safety risk.<sup>20</sup> Further, there are very compelling reasons to welcome its adoption due to reductions in unhealthy pollution associated with burning coal. Every GWh of electricity generated by burning coal produces about 4 grams of cadmium air emissions.<sup>21</sup> Even though North Carolina produces a significant fraction of our electricity from coal, electricity from solar offsets much more natural gas than coal due to natural gas plants being able to adjust their rate of production more easily and quickly. If solar electricity offsets 90% natural gas and 10% coal, each 5-megawatt (5 MWAC, which is generally 7 MWDC) CdTe solar facility in North Carolina keeps about 157 grams, or about a third of a pound, of cadmium *out* of our environment.<sup>22, 23</sup>

Cadmium is toxic, but all the approximately 7 grams of cadmium in one CdTe panel is in the form of a chemical compound cadmium telluride,<sup>24</sup> which has 1/100th the toxicity of free cadmium.<sup>25</sup> Cadmium telluride is a very stable compound that is non-volatile and non-soluble in water. Even in the case of a fire, research shows that less than 0.1% of the cadmium is released when a CdTe

panel is exposed to fire. The fire melts the glass and encapsulates over 99.9% of the cadmium in the molten glass.<sup>27</sup>

It is important to understand the source of the cadmium used to manufacture CdTe PV panels. The cadmium is a byproduct of zinc and lead refining. The element is collected from emissions and waste streams during the production of these metals and combined with tellurium to create the CdTe used in PV panels. If the cadmium were not collected for use in the PV panels or other products, it would otherwise either be stockpiled for future use, cemented and buried, or disposed of.<sup>28</sup> Nearly all the cadmium in old or broken panels can be recycled which can eventually serve as the primary source of cadmium for new PV panels.<sup>29</sup>

Similar to silicon-based PV panels, CdTe panels are constructed of a tempered glass front, one instead of two clear plastic encapsulation layers, and a rear heat strengthened glass backing (together >98% by weight). The final product is built to withstand exposure to the elements without significant damage for over 25 years. While not representative of damage that may occur in the field or even at a landfill, laboratory evidence has illustrated that when panels are ground into a fine powder, very acidic water is able to leach portions of the cadmium and tellurium,<sup>30</sup> similar to the process used to recycle CdTe panels. Like many silicon-based panels, CdTe panels are reported (as far back as 1998<sup>31</sup> to pass the EPA's Toxic Characteristic Leaching Procedure (TCLP) test, which tests the potential for crushed panels in a landfill to leach hazardous substances into groundwater.<sup>32</sup> Passing this test means that they are classified as non-hazardous waste and can be deposited in landfills.<sup>33,34</sup> For more information about PV panel end-of-life, see the Panel Disposal section.

There is also concern of environmental impact resulting from potential catastrophic events involving CdTe PV panels. An analysis of worst-case scenarios for environmental impact from CdTe PV



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panels, including earthquakes, fires, and floods, was conducted by the University of Tokyo in 2013. After reviewing the extensive international body of research on CdTe PV technology, their report concluded, “Even in the worst-case scenarios, it is unlikely that the Cd concentrations in air and sea water will exceed the environmental regulation values.”<sup>35</sup> In a worst-case scenario of damaged panels abandoned on the ground, insignificant amounts of cadmium will leach from the panels. This is because this scenario is much less conducive (larger module pieces, less acidity) to leaching than the conditions of the EPA’s TCLP test used to simulate landfill conditions, which CdTe panels pass.<sup>36</sup>

First Solar, a U.S. company, and the only significant supplier of CdTe panels, has a robust panel take-back and recycling program that has been operating commercially since 2005.<sup>37</sup> The company states that it is “committed to providing a commercially attractive recycling solution for photovoltaic (PV) power plant and module owners to help them meet their module (end of life) EOL obligation simply, costeffectively and responsibly.” First Solar global recycling services to their customers to collect and recycle panels once they reach the end of productive life whether due to age or damage. These recycling service agreements are structured to be financially attractive to both First Solar and the solar panel owner. For First Solar, the contract provides the company with an affordable source of raw materials needed for new panels and presumably a diminished risk of undesired release of Cd. The contract also benefits the solar panel owner by allowing them to avoid tipping fees at a waste disposal site. The legal contract helps provide peace of mind by ensuring compliance by both parties when considering the continuing trend of rising disposal costs and increasing regulatory requirements.

### **c. CIS/CIGS and other PV technologies**

Copper indium gallium selenide PV technology, of-

ten referred to as CIGS, is the second most common type of thin-film PV panel but a distant second behind CdTe. CIGS cells are composed of a thin layer of copper, indium, gallium, and selenium on a glass or plastic backing. None of these elements are very toxic, although selenium is a regulated metal under the Federal Resource Conservation and Recovery Act (RCRA).<sup>38</sup> The cells often also have an extremely thin layer of cadmium sulfide that contains a tiny amount of cadmium, which is toxic. The promise of high efficiency CIGS panels drove heavy investment in this technology in the past. However, researchers have struggled to transfer high efficiency success in the lab to low-cost full-scale panels in the field.<sup>39</sup> Recently, a CIGS manufacturer based in Japan, Solar Frontier, has achieved some market success with a rigid, glass-faced CIGS module that competes with silicon panels. Solar Frontier produces the majority of CIS panels on the market today.<sup>40</sup> Notably, these panels are RoHS compliant,<sup>41</sup> thus meeting the rigorous toxicity standard adopted by the European Union even though this directive exempts PV panels. The authors are unaware of any completed or proposed utility-scale system in North Carolina using CIS/CIGS panels.

## **1.2.3 Panel End-of-Life Management**

Concerns about the volume, disposal, toxicity, and recycling of PV panels are addressed in this subsection. To put the volume of PV waste into perspective, consider that by 2050, when PV systems installed in 2020 will reach the end of their lives, it is estimated that the global annual PV panel waste tonnage will be 10% of the 2014 global e-waste tonnage.<sup>42</sup> In the U.S., end-of-life disposal of solar products is governed by the Federal Resource Conservation and Recovery Act (RCRA), as well as state policies in some situations. RCRA separates waste into hazardous (not accepted at ordinary landfill) and solid waste (generally accepted

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at ordinary landfill) based on a series of rules. According to RCRA, the way to determine if a PV panel is classified as hazardous waste is the Toxic Characteristic Leaching Procedure (TCLP) test. This EPA test is designed to simulate landfill disposal and determine the risk of hazardous substances leaching out of the landfill.<sup>43,44,45</sup> Multiple sources report that most modern PV panels (both crystalline silicon and cadmium telluride) pass the TCLP test.<sup>46,47</sup> Some studies found that some older (1990s) crystalline silicon panels, and perhaps some newer crystalline silicon panels (specifics are not given about vintage of panels tested), do not pass the lead (Pb) leachate limits in the TCLP test.<sup>48,49</sup>

The test begins with the crushing of a panel into centimeter-sized pieces. The pieces are then mixed in an acid bath. After tumbling for eighteen hours, the fluid is tested for forty hazardous substances that all must be below specific threshold levels to pass the test. Research comparing TCLP conditions to conditions of damaged panels in the field found that simulated landfill conditions provide overly conservative estimates of leaching for field-damaged panels.<sup>50</sup> Additionally, research in Japan has found no detectable Cd leaching from cracked CdTe panels when exposed to simulated acid rain.<sup>51</sup>

Although modern panels can generally be landfilled, they can also be recycled. Even though recent waste volume has not been adequate to support significant PV-specific recycling infrastructure, the existing recycling industry in North Carolina reports that it recycles much of the current small volume of broken PV panels. In an informal survey conducted by the NC Clean Energy Technology Center survey in early 2016, seven of the eight large active North Carolina utility-scale solar developers surveyed reported that they send damaged panels back to the manufacturer and/or to a local recycler. Only one developer reported sending damaged panels to the landfill.

The developers reported at that time that they are usually paid a small amount per panel by local recycling firms. In early 2017, a PV developer reported that a local recycler was charging a small fee per panel to recycle damaged PV panels. The local recycling firm known to authors to accept PV panels described their current PV panel recycling practice as of early 2016 as removing the aluminum frame for local recycling and removing the wire leads for local copper recycling. The remainder of the panel is sent to a facility for processing the non-metallic portions of crushed vehicles, referred to as “fluff” in the recycling industry.<sup>52</sup> This processing within existing general recycling plants allows for significant material recovery of major components, including glass which is 80% of the module weight, but at lower yields than PV-specific recycling plants. Notably almost half of the material value in a PV panel is in the few grams of silver contained in almost every PV panel produced today. In the long-term, dedicated PV panel recycling plants can increase treatment capacities and maximize revenues resulting in better output quality and the ability to recover a greater fraction of the useful materials.<sup>53</sup> PV-specific panel recycling technologies have been researched and implemented to some extent for the past decade, and have been shown to be able to recover over 95% of PV material (semiconductor) and over 90% of the glass in a PV panel.<sup>54</sup>

A look at global PV recycling trends hints at the future possibilities of the practice in our country. Europe installed MW-scale volumes of PV years before the U.S. In 2007, a public-private partnership between the European Union and the solar industry set up a voluntary collection and recycling system called PV CYCLE. This arrangement was later made mandatory under the EU’s WEEE directive, a program for waste electrical and electronic equipment.<sup>55</sup> Its member companies (PV panel producers) fully finance the association. This makes it possible for end-users to return the member companies’ defective panels for recycling at any of the over 300 collection points around



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Europe without added costs. Additionally, PV CYCLE will pick up batches of 40 or more used panels at no cost to the user. This arrangement has been very successful, collecting and recycling over 13,000 tons by the end of 2015.<sup>56</sup>

In 2012, the WEEE Directive added the end-of-life collection and recycling of PV panels to its scope.<sup>57</sup> This directive is based on the principle of extended-producer-responsibility. It has a global impact because producers that want to sell into the EU market are legally responsible for end-of-life management. Starting in 2018, this directive targets that 85% of PV products “put in the market” in Europe are recovered and 80% is prepared for reuse and recycling.

The success of the PV panel collection and recycling practices in Europe provides promise for the future of recycling in the U.S. In mid-2016, the US Solar Energy Industry Association (SEIA) announced that they are starting a national solar panel recycling program with the guidance and support of many leading PV panel producers.<sup>58</sup> The program will aggregate the services offered by recycling vendors and PV manufacturers, which will make it easier for consumers to select a cost-effective and environmentally responsible end-of-life management solution for their PV products. According to SEIA, they are planning the program in an effort to make the entire industry landfill-free. In addition to the national recycling network program, the program will provide a portal for system owners and consumers with information on how to responsibly recycle their PV systems.

While a cautious approach toward the potential for negative environmental and/or health impacts from retired PV panels is fully warranted, this section has shown that the positive health impacts of reduced emissions from fossil fuel combustion from PV systems more than outweighs any potential risk. Testing shows that silicon and CdTe panels are both safe to dispose of in landfills, and are also safe in worst case conditions of abandonment or damage in a disaster. Additionally, analysis by local engineers has found that the current salvage

value of the equipment in a utility scale PV facility generally exceeds general contractor estimates for the cost to remove the entire PV system.<sup>59,60,61</sup>

## 1.2.4 Non-Panel System Components

### **(racking, wiring, inverter, transformer)**

While previous toxicity subsections discussed PV panels, this subsection describes the non-panel components of utility-scale PV systems and investigates any potential public health and safety concerns. The most significant non-panel component of a ground-mounted PV system is the mounting structure of the rows of panels, commonly referred to as “racking”. The vertical post portion of the racking is galvanized steel and the remaining above-ground racking components are either galvanized steel or aluminum, which are both extremely common and benign building materials. The inverters that make the solar generated electricity ready to send to the grid have weather-proof steel enclosures that protect the working components from the elements. The only fluids that they might contain are associated with their cooling systems, which are not unlike the cooling system in a computer. Many inverters today are RoHS compliant.

The electrical transformers (to boost the inverter output voltage to the voltage of the utility connection point) do contain a liquid cooling oil. However, the fluid used for that function is either a nontoxic mineral oil or a biodegradable non-toxic vegetable oil, such as BIOTEMP from ABB. These vegetable transformer oils have the additional advantage of being much less flammable than traditional mineral oils. Significant health hazards are associated with old transformers containing cooling oil with toxic PCBs. Transformers with PCB-containing oil were common before PCBs were outlawed in the U.S. in 1979. PCBs still exist in older transformers in the field across the country.

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Other than a few utility research sites, there are no batteries on- or off-site associated with utility-scale solar energy facilities in North Carolina, avoiding any potential health or safety concerns related to battery technologies. However, as battery technologies continue to improve and prices continue to decline we are likely to start seeing some batteries at solar facilities. Lithium ion batteries currently dominate the world utility-scale battery market, which are not very toxic. No non-panel system components were found to pose any health or environmental dangers.

## 1.4 Operations and Maintenance – Panel Washing and Vegetation Control

Throughout the eastern U.S., the climate provides frequent and heavy enough rain to keep panels adequately clean. This dependable weather pattern eliminates the need to wash the panels on a regular basis. Some system owners may choose to wash panels as often as once a year to increase production, but most in N.C. do not regularly wash any PV panels. Dirt build up over time may justify panel washing a few times over the panels' lifetime; however, nothing more than soap and water are required for this activity.

The maintenance of ground-mounted PV facilities requires that vegetation be kept low, both for aesthetics and to avoid shading of the PV panels. Several approaches are used to maintain vegetation at NC solar facilities, including planting of limited-height species, mowing, weed-eating, herbicides, and grazing livestock (sheep). The following descriptions of vegetation maintenance practices are based on interviews with several solar developers as well as with three maintenance firms that together are contracted to maintain well over 100

of the solar facilities in N.C. The majority of solar facilities in North Carolina maintain vegetation primarily by mowing. Each row of panels has a single row of supports, allowing sickle mowers to mow under the panels. The sites usually require mowing about once a month during the growing season. Some sites employ sheep to graze the site, which greatly reduces the human effort required to maintain the vegetation and produces high quality lamb meat.<sup>62</sup>

In addition to mowing and weed eating, solar facilities often use some herbicides. Solar facilities generally do not spray herbicides over the entire acreage; rather they apply them only in strategic locations such as at the base of the perimeter fence, around exterior vegetative buffer, on interior dirt roads, and near the panel support posts. Also unlike many row crop operations, solar facilities generally use only general use herbicides, which are available over the counter, as opposed to restricted use herbicides commonly used in commercial agriculture that require a special restricted use license. The herbicides used at solar facilities are primarily 2-4-D and glyphosate (Round-up®), which are two of the most common herbicides used in lawns, parks, and agriculture across the country. One maintenance firm that was interviewed sprays the grass with a class of herbicide known as a growth regulator in order to slow the growth of grass so that mowing is only required twice a year. Growth regulators are commonly used on highway roadsides and golf courses for the same purpose. A commercial pesticide applicator license is required for anyone other than the landowner to apply herbicides, which helps ensure that all applicators are adequately educated about proper herbicide use and application. The license must be renewed annually and requires passing of a certification exam appropriate to the area in which the applicator wishes to work. Based on the limited data available, it appears that solar facilities in N.C. generally use significantly less herbicides per acre than most commercial agriculture or lawn maintenance services.



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## 2. Electromagnetic Fields (EMF)

PV systems do not emit any material during their operation; however, they do generate electromagnetic fields (EMF), sometimes referred to as radiation. EMF produced by electricity is non-ionizing radiation, meaning the radiation has enough energy to move atoms in a molecule around (experienced as heat), but not enough energy to remove electrons from an atom or molecule (ionize) or to damage DNA. As shown below, modern humans are all exposed to EMF throughout our daily lives without negative health impact. Someone outside of the fenced perimeter of a solar facility is not exposed to significant EMF from the solar facility. Therefore, there is no negative health impact from the EMF produced in a solar farm. The following paragraphs provide some additional background and detail to support this conclusion.

Since the 1970s, some have expressed concern over potential health consequences of EMF from electricity, but no studies have ever shown this EMF to cause health problems.<sup>63</sup> These concerns are based on some epidemiological studies that found a slight increase in childhood leukemia associated with average exposure to residential power-frequency magnetic fields above 0.3 to 0.4  $\mu\text{T}$  (microteslas) (equal to 3.0 to 4.0 mG (milligauss)).  $\mu\text{T}$  and mG are both units used to measure magnetic field strength. For comparison, the average exposure for people in the U.S. is one mG or 0.1  $\mu\text{T}$ , with about 1% of the population with an average exposure in excess of 0.4  $\mu\text{T}$  (or 4 mG).<sup>64</sup> These epidemiological studies, which found an association but not a causal relationship, led the World Health Organization's International Agency for Research on Cancer (IARC) to classify ELF magnetic fields as "possibly carcinogenic to humans". Coffee also has this classification. This classification means there is limited evidence but not enough evidence to designate

as either a "probable carcinogen" or "human carcinogen". Overall, there is very little concern that ELF EMF damages public health. The only concern that does exist is for long-term exposure above 0.4  $\mu\text{T}$  (4 mG) that may have some connection to increased cases of childhood leukemia. In 1997, the National Academies of Science were directed by Congress to examine this concern and concluded:

*"Based on a comprehensive evaluation of published studies relating to the effects of power-frequency electric and magnetic fields on cells, tissues, and organisms (including humans), the conclusion of the committee is that the current body of evidence does not show that exposure to these fields presents a human-health hazard. Specifically, no conclusive and consistent evidence shows that exposures to residential electric and magnetic fields produce cancer, adverse neurobehavioral effects, or reproductive and developmental effects."*<sup>65</sup>

There are two aspects to electromagnetic fields, an electric field and a magnetic field. The electric field is generated by voltage and the magnetic field is generated by electric current, i.e., moving electrons. A task group of scientific experts convened by the World Health Organization (WHO) in 2005 concluded that there were no substantive health issues related to electric fields (0 to 100,000 Hz) at levels generally encountered by members of the public.<sup>66</sup> The relatively low voltages in a solar facility and the fact that electric fields are easily shielded (i.e., blocked) by common materials, such as plastic, metal, or soil means that there is no concern of negative health impacts from the electric fields generated by a solar facility. Thus, the remainder of this section addresses magnetic fields. Magnetic fields are not shielded by most common materials and thus can easily pass through them. Both types of fields are strongest close to the source of electric generation and weaken quickly with distance from the source.

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The direct current (DC) electricity produced by PV panels produce stationary (0 Hz) electric and magnetic fields. Because of minimal concern about potential risks of stationary fields, little scientific research has examined stationary fields' impact on human health.<sup>67</sup> In even the largest PV facilities, the DC voltages and currents are not very high. One can illustrate the weakness of the EMF generated by a PV panel by placing a compass on an operating solar panel and observing that the needle still points north.

While the electricity throughout the majority of a solar site is DC electricity, the inverters convert this DC electricity to alternating current (AC) electricity matching the 60 Hz frequency of the grid. Therefore, the inverters and the wires delivering this power to the grid are producing non-stationary EMF, known as extremely low frequency (ELF) EMF, normally oscillating with a frequency of 60 Hz. This frequency is at the low-energy end of the electromagnetic spectrum. Therefore, it has less energy than other commonly encountered types of non-ionizing radiation like radio waves, infrared radiation, and visible light.

The wide use of electricity results in background levels of ELF EMFs in nearly all locations where people spend time – homes, workplaces, schools, cars, the supermarket, etc. A person's average exposure depends upon the sources they encounter, how close they are to them, and the amount of time they spend there.<sup>68</sup> As stated above, the average exposure to magnetic fields in the U.S. is estimated to be around one mG or 0.1  $\mu$ T, but can vary considerably depending on a person's exposure to EMF from electrical devices and wiring.<sup>69</sup> At times we are often exposed to much higher ELF magnetic fields, for example when standing three feet from a refrigerator the ELF magnetic field is 6 mG and when standing three feet from a microwave oven the field is about 50 mG.<sup>70</sup> The strength of these fields diminish quickly with distance from the source, but when surrounded by electricity in our homes and other buildings moving away from

one source moves you closer to another. However, unless you are inside of the fence at a utility-scale solar facility or electrical substation it is impossible to get very close to the EMF sources. Because of this, EMF levels at the fence of electrical substations containing high voltages and currents are considered "generally negligible".<sup>71,72</sup>

The strength of ELF-EMF present at the perimeter of a solar facility or near a PV system in a commercial or residential building is significantly lower than the typical American's average EMF exposure.<sup>73,74</sup> Researchers in Massachusetts measured magnetic fields at PV projects and found the magnetic fields dropped to very low levels of 0.5 mG or less, and in many cases to less than background levels (0.2 mG), at distances of no more than nine feet from the residential inverters and 150 feet from the utility-scale inverters.<sup>75</sup> Even when measured within a few feet of the utility-scale inverter, the ELF magnetic fields were well below the International Commission on Non-Ionizing Radiation Protection's recommended magnetic field level exposure limit for the general public of 2,000 mG.<sup>76</sup> It is typical that utility scale designs locate large inverters central to the PV panels that feed them because this minimizes the length of wire required and shields neighbors from the sound of the inverter's cooling fans. Thus, it is rare for a large PV inverter to be within 150 feet of the project's security fence.

Anyone relying on a medical device such as pacemaker or other implanted device to maintain proper heart rhythm may have concern about the potential for a solar project to interfere with the operation of his or her device. However, there is no reason for concern because the EMF outside of the solar facility's fence is less than 1/1000 of the level at which manufacturers test for ELF EMF interference, which is 1,000 mG.<sup>77</sup> Manufacturers of potentially affected implanted devices often provide advice on electromagnetic interference that includes avoiding letting the implanted device get too close to certain sources of fields such as some



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household appliances, some walkie-talkies, and similar transmitting devices. Some manufacturers' literature does not mention high-voltage power lines, some say that exposure in public areas should not give interference, and some advise not spending extended periods of time close to power lines.<sup>78</sup>

## 3. Electric Shock and Arc Flash Hazards

There is a real danger of electric shock to anyone entering any of the electrical cabinets such as combiner boxes, disconnect switches, inverters, or transformers; or otherwise coming in contact with voltages over 50 Volts.<sup>79</sup> Another electrical hazard is an arc flash, which is an explosion of energy that can occur in a short circuit situation. This explosive release of energy causes a flash of heat and a shockwave, both of which can cause serious injury or death. Properly trained and equipped technicians and electricians know how to safely install, test, and repair PV systems, but there is always some risk of injury when hazardous voltages and/or currents are present. Untrained individuals should not attempt to inspect, test, or repair any aspect of a PV system due to the potential for injury or death due to electric shock and arc flash. The National Electric Code (NEC) requires appropriate levels of warning signs on all electrical components based on the level of danger determined by the voltages and current potentials. The national electric code also requires the site to be secured from unauthorized visitors with either a six-foot chain link fence with three strands of barbed wire or an eight-foot fence, both with adequate hazard warning signs.

## 4. Fire Safety

The possibility of fires resulting from or intensified by PV systems may trigger concern among the

general public as well as among firefighters. However, concern over solar fire hazards should be limited because only a small portion of materials in the panels are flammable, and those components cannot self-support a significant fire. Flammable components of PV panels include the thin layers of polymer encapsulates surrounding the PV cells, polymer backsheets (framed panels only), plastic junction boxes on rear of panel, and insulation on wiring. The rest of the panel is composed of non-flammable components, notably including one or two layers of protective glass that make up over three quarters of the panel's weight.

Heat from a small flame is not adequate to ignite a PV panel, but heat from a more intense fire or energy from an electrical fault can ignite a PV panel.<sup>80</sup> One real-world example of this occurred during July 2015 in an arid area of California. Three acres of grass under a thin film PV facility burned without igniting the panels mounted on fixed-tilt racks just above the grass.<sup>81</sup> While it is possible for electrical faults in PV systems on homes or commercial buildings to start a fire, this is extremely rare.<sup>82</sup> Improving understanding of the PV-specific risks, safer system designs, and updated fire-related codes and standards will continue to reduce the risk of fire caused by PV systems.

PV systems on buildings can affect firefighters in two primary ways, 1) impact their methods of fighting the fire, and 2) pose safety hazard to the firefighters. One of the most important techniques that firefighters use to suppress fire is ventilation of a building's roof. This technique allows superheated toxic gases to quickly exit the building. By doing so, the firefighters gain easier and safer access to the building. Ventilation of the roof also makes the challenge of putting out the fire easier. However, the placement of rooftop PV panels may interfere with ventilating the roof by limiting access to desired venting locations.

New solar-specific building code requirements are working to minimize these concerns. Also, the

latest National Electric Code has added requirements that make it easier for first responders to safely and effectively turn off a PV system. Concern for firefighting a building with PV can be reduced with proper fire fighter training, system design, and installation. Numerous organizations have studied fire fighter safety related to PV. Many organizations have published valuable guides and training programs. Some notable examples are listed below.

- The International Association of Fire Fighters (IAFF) and International Renewable Energy Council (IREC) partnered to create an online training course that is far beyond the PowerPoint click-and-view model. The self-paced online course, “Solar PV Safety for Fire Fighters,” features rich video content and simulated environments so fire fighters can practice the knowledge they’ve learned. [www.iaff.org/pvsafetytraining](http://www.iaff.org/pvsafetytraining)
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- [PV Safety & Firefighting](#), Matthew Paiss, Homepower Magazine
- [PV Safety and Code Development](#): Matthew Paiss, Cooperative Research Network

## Summary

The purpose of this paper is to address and alleviate concerns of public health and safety for utility-scale solar PV projects. Concerns of public health and safety were divided and discussed in the four following sections: (1) Toxicity, (2) Electromagnetic Fields, (3) Electric Shock and Arc Flash, and (4) Fire. In each of these sections, the negative health and safety impacts of utility-scale PV development were shown to be negligible, while the public health and safety benefits of installing these facilities are significant and far outweigh any negative impacts.

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[http://www.nreca.coop/wp-content/uploads/2013/06/ts\\_pv\\_fire\\_safety\\_oct\\_2014.pdf](http://www.nreca.coop/wp-content/uploads/2013/06/ts_pv_fire_safety_oct_2014.pdf)





## Report to the Green Bay Plan Commission

### MEETING DATE

March 15, 2024

### PREPARED BY

Dena Mooney, Staff

### AGENDA ITEM # E.3

(CSM 24-07) Consideration with possible action on a request to create a 4-lot Certified Survey Map that includes public street dedication at 0 Lime Kiln Road (Parcel 23-243-1), submitted by Department of Community and Economic Development on behalf of the Redevelopment Authority of the City of Green Bay, Property Owner (Ald. Morgan, District 3).

### BACKGROUND

**Reason for Request:** To create a 4-lot Certified Survey Map (CSM) that includes the dedication of right-of-way for the development of a mixed-use neighborhood that will have new housing opportunities, destination community parks, and an urban farm with a community center facility/barn.

**Subject Parcel Zoning and Land Use:** Subject area is vacant and zoned Planned Unit Development (PUD).

**Surrounding Zoning and Land Uses:**

**NORTH:** Business Park District (BP) Green Bay School District Services Building

**SOUTH:** Village of Bellevue Railroad Tracks

**EAST:** Village of Bellevue Single-family homes and Walmart Store

**WEST:** Public Institutional District (PI) Kroc Community Center

**Comprehensive Plan:** The 2022 Smart Growth Plan designates this area for light industrial use. The recent zoning change to Planned Unit Development (December 2023) included a condition that the future land use plan reflects the residential nature of the property when it is rewritten.

**Analysis:** In December 2023, the City Council approved a Planned Unit Development (PUD) for this site. The project is known as the JBS Redevelopment Project. For background, the overall development area is approximately 25.61 acres of land with 22.98 located within the City of Green Bay and 2.63 acres being located within the Village of Bellevue. The development is proposed to incorporate three primary elements:

- **Housing:** A variety of housing choices and types are proposed to be included in the development plan. The Redevelopment Authority is soliciting proposals from developers with an emphasis on including both owner-occupied and rental single-family, two-family, townhomes, and lower density multifamily units. The intent is to provide both market rate and affordable options.
- **Community Parks:** Active and passive recreation opportunities and programmable spaces are proposed strategically throughout the development to enhance the area.
- **Urban Farming:** A concept to focus more on the family level sustainability of production with potential training and support facilities including a community center.

Key aspects of the plan include a Grand Boulevard and an “activity zone” that will connect the development to Guns Street. The Grand Boulevard roadway will be designed to support both vehicular traffic and community activity. Other key aspects are longer-term goals of providing connectivity between existing

neighborhoods (both vehicular and pedestrian) within the City of Green Bay and an east-west connecting roadway between Lime Kiln Road and Guns Road.

After the PUD was approved, the Redevelopment Authority (RDA) issued a Request for Proposals with those due March 29, 2024, and submitted a Certified Survey Map (CSM) to the Department of Community and Economic Development for review and approval. Certified Survey Maps and Plats that include a dedication to the public require approval by City Council. In the past, this has been done administratively. The CSM for this project does include the creation of new roads and is being brought before the Plan Commission and City Council for that reason. A separate CSM has been created for the portion of the development located in the Village of Bellevue. That CSM is currently being reviewed by the Village. A public hearing about this item is scheduled to be held by the City Council on April 16, 2024.

Planning staff have forwarded the 4-lot CSM to the land division review team for review. Comments are due March 21, 2024. Since the CSM may be revised to address any comments received, staff recommends that a condition for approval is that the CSM must comply with all land division review comments prior to being recorded.

## RECOMMENDATION

Staff is recommending approval of the request, subject to the following conditions:

1. Compliance with all regulations of the Green Bay Municipal Code.
2. The Certified Survey Map must comply with all land division review comments prior to being recorded.

## FISCAL IMPACT

## ATTACHMENTS

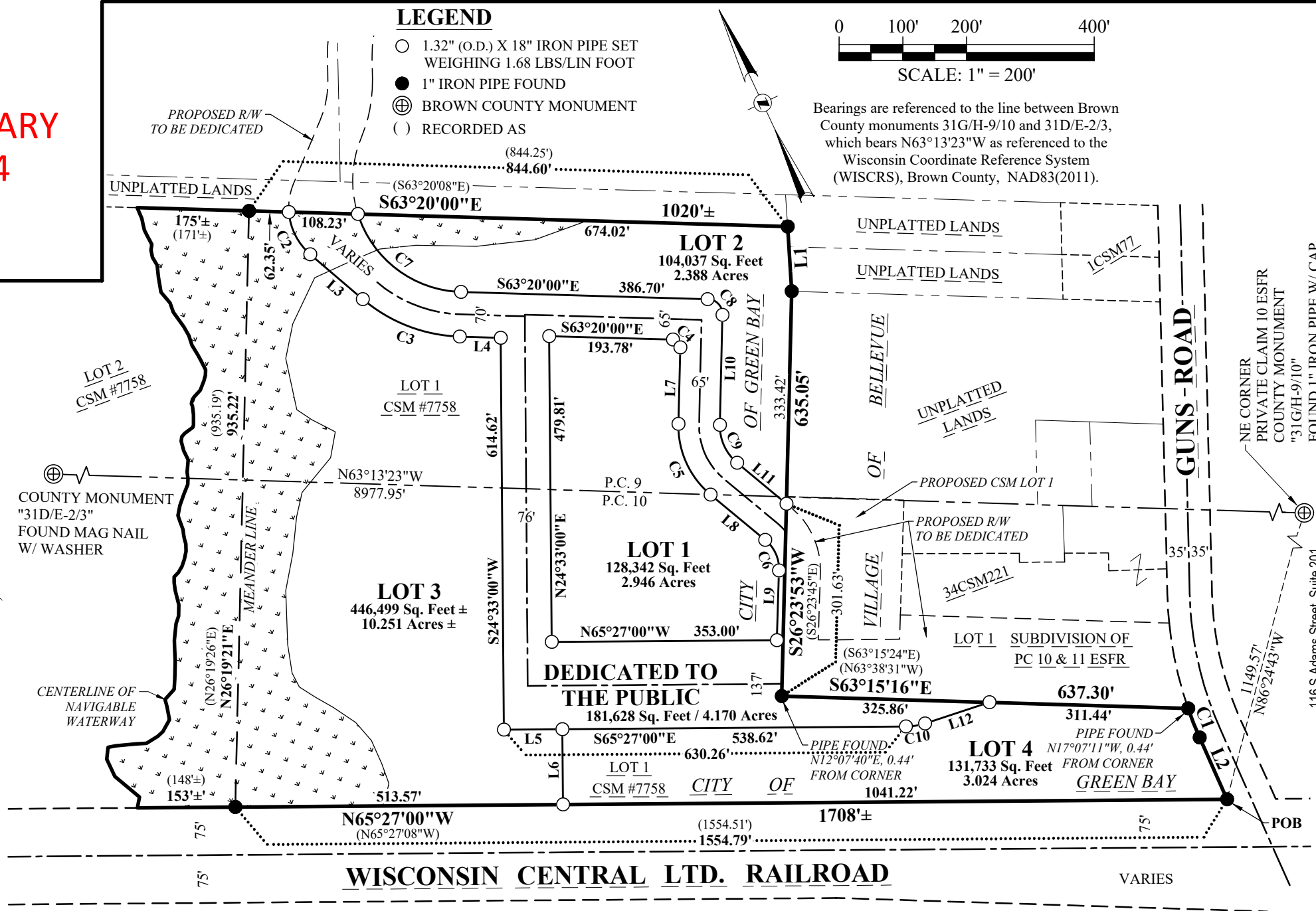
1. CSM 24-07 0 Lime Kiln Preliminary CSM
2. CSM 24-07 Location Map
3. P.O. 01-24 regarding CSM at 0 Lime Kiln Road



PRELIMINARY  
2-27-24

CERTIFIED SURVEY MAP

ALL OF LOT 1 OF VOLUME 53 OF CERTIFIED SURVEY MAPS PAGE 221, MAP NO. 7758, RECORDED AS DOCUMENT NO. 2350722, BEING PART OF PRIVATE CLAIMS 9 AND 10, EAST SIDE FOX RIVER, CITY OF GREEN BAY, BROWN COUNTY, WISCONSIN



NOTE: WETLAND DELINEATION COMPLETED BY GRAEF, DATED 9/18/23

NOTE: SEE SHEET 4 FOR LINE AND CURVE DATA

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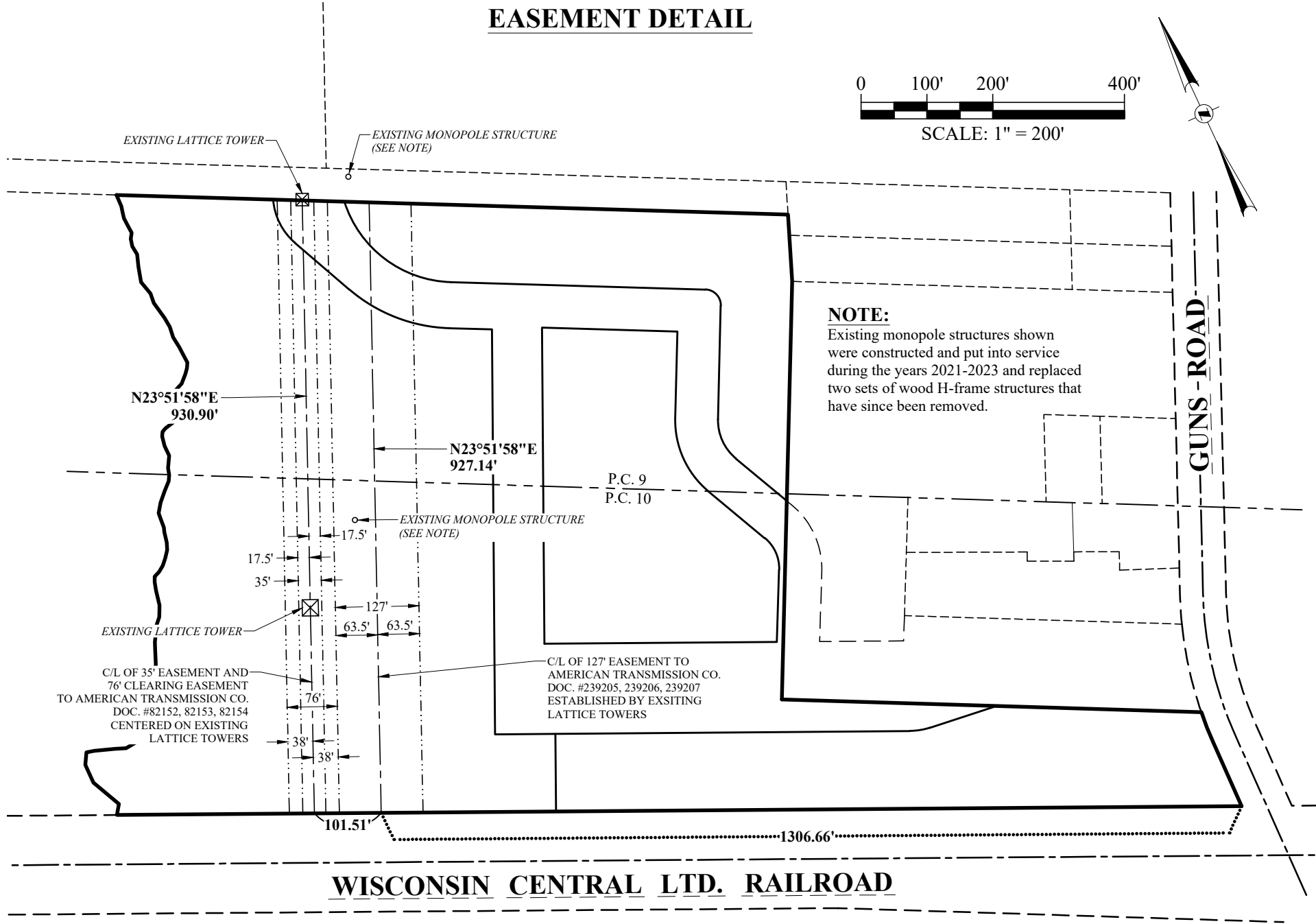
Project No: 2022-0399  
Drawn By: TMC  
Sheet No: 1 of 6



PRELIMINARY  
2-27-24

## CERTIFIED SURVEY MAP

ALL OF LOT 1 OF VOLUME 53 OF CERTIFIED SURVEY MAPS PAGE 221, MAP NO. 7758,  
RECORDED AS DOCUMENT NO. 2350722, BEING PART OF PRIVATE CLAIMS 9 AND 10,  
EAST SIDE FOX RIVER, CITY OF GREEN BAY, BROWN COUNTY, WISCONSIN



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**GRAEF**

Project No: 2022-0399  
Drawn By: TMC  
Sheet No: 2 of 6



# CERTIFIED SURVEY MAP

**EASEMENT DETAIL**

0 100' 200' 400'

SCALE: 1" = 200'

12' UTILITY EASEMENT

12' UTILITY EASEMENT PER CSM #7758

12' UTILITY EASEMENT

50' PIPE LINE EASEMENT TO WEST SHORE PIPE LINE CO. DOC. #575395, 575396, 575397 CENTERED ON SURVEYED PIPELINE LOCATION

50'

P.C. 9  
P.C. 10

N24°13'58"E  
759.57'

C/L PIPE LINE EASEMENT TO WISCONSIN PUBLIC SERVICE CORP. (WIDTH UNKNOWN) DOC. #699632, 699634

N68°51'58"E  
180.00'

N23°51'58"E  
39.00'

12' UTILITY EASEMENT

12' UTILITY EASEMENT PER CSM #7758

40' SANITARY SEWER EASEMENT PER CSM #7758

1446.17'

GUNS ROAD

WISCONSIN CENTRAL LTD. RAILROAD

# GRAFF

Project No: 2022-0399  
 Drawn By: TMC  
 Sheet No: 3 of 6

CERTIFIED SURVEY MAP

ALL OF LOT 1 OF VOLUME 53 OF CERTIFIED SURVEY MAPS PAGE 221, MAP NO. 7758,  
RECORDED AS DOCUMENT NO. 2350722, BEING PART OF PRIVATE CLAIMS 9 AND 10,  
EAST SIDE FOX RIVER, CITY OF GREEN BAY, BROWN COUNTY, WISCONSIN

| LINE TABLE |             |         |
|------------|-------------|---------|
| LINE       | BEARING     | LENGTH  |
| L1         | S21°26'20"W | 101.61' |
| L2         | S01°02'03"W | 105.94' |
| L3         | S24°26'52"E | 108.30' |
| L4         | S63°20'00"E | 64.33'  |
| L5         | S65°27'00"E | 91.64'  |
| L6         | N24°33'00"E | 118.00' |
| L7         | S26°21'53"W | 119.86' |
| L8         | S25°16'37"E | 111.14' |
| L9         | S26°44'53"W | 109.31' |
| L10        | S26°21'53"W | 172.58' |
| L11        | S25°16'37"E | 100.55' |
| L12        | S83°06'23"E | 106.24' |

CURVE TABLE

| CURVE # | RADIUS  | LENGTH  | CHORD BEARING | CHORD LENGTH | DELTA     | TAN. IN     | TAN. OUT    |
|---------|---------|---------|---------------|--------------|-----------|-------------|-------------|
| C1      | 588.04' | 49.16'  | S03°25'44"W   | 49.14'       | 4°47'22"  | S05°49'25"W | S01°02'03"W |
| C2      | 96.50'  | 76.18'  | S01°50'01"E   | 74.21'       | 45°13'43" | S20°46'51"W | S24°26'52"E |
| C3      | 245.00' | 166.28' | S43°53'26"E   | 163.10'      | 38°53'07" | S24°26'52"E | S63°20'00"E |
| C4      | 12.00'  | 18.79'  | S18°29'03"E   | 16.93'       | 89°41'53" | S63°20'00"E | S26°21'53"W |
| C5      | 140.00' | 126.18' | S00°32'38"W   | 121.96'      | 51°38'30" | S26°21'53"W | S25°16'37"E |
| C6      | 60.00'  | 54.48'  | S00°44'08"W   | 52.63'       | 52°01'30" | S25°16'37"E | S26°44'53"W |
| C7      | 175.00' | 216.30' | S27°55'27"E   | 202.79'      | 70°49'04" | S07°29'05"W | S63°20'00"E |
| C8      | 24.00'  | 37.57'  | S18°29'03"E   | 33.85'       | 89°41'53" | S63°20'00"E | S26°21'53"W |
| C9      | 75.00'  | 67.60'  | S00°32'38"W   | 65.33'       | 51°38'30" | S26°21'53"W | S25°16'37"E |
| C10     | 99.50'  | 30.66'  | S74°16'41"E   | 30.54'       | 17°39'23" | S65°27'00"E | S83°06'23"E |



PRELIMINARY  
2-27-24

CERTIFIED SURVEY MAP

ALL OF LOT 1 OF VOLUME 53 OF CERTIFIED SURVEY MAPS PAGE 221, MAP NO. 7758,  
RECORDED AS DOCUMENT NO. 2350722, BEING PART OF PRIVATE CLAIMS 9 AND 10,  
EAST SIDE FOX RIVER, CITY OF GREEN BAY, BROWN COUNTY, WISCONSIN

SURVEYOR'S CERTIFICATE:

I, Troy M. Collins, Professional Land Surveyor, do hereby certify that I have surveyed, divided, mapped, and dedicated all of Lot 1 of Volume 53 Certified Survey Maps, Page 221, Map No. 7758, recorded as Document No. 2350722, and part of Lot 1 of the Subdivision of Private Claims 10 and 11, East Side Fox River, located in the City of Green Bay and the Village Bellevue, Brown County, Wisconsin, fully described as follows:

Commencing at Brown County Certified Land Corner 31G/H-9/10, being the Northeast corner of Private Claim 10, East Side Fox River; Thence N86°24'43"W, 1149.57 feet to a point on the Westerly right-of-way line of Guns Road, being the Southernmost corner of Lot 1 of Certified Survey Map No. 7758 and the Point of Beginning; Thence N65°27'00"W, 1554.79 feet along the Southerly line of said Lot 1 to a meander line; Thence N26°19'21"E, 935.22 feet along said meander line to the Northerly line of said Lot 1; Thence S63°20'00"E, 844.60 feet along said Northerly line to the Northeasterly corner of said Lot 1; Thence S21°26'20"W, 101.61 feet along the Easterly line of said Lot 1; Thence S26°23'53"W, 635.05 feet along said Easterly line; Thence S63°15'16"E, 637.30 feet along said Easterly line to said Westerly right-of-way line; Thence 49.16 feet Southerly along said Westerly right-of-way line, being the arc of a 588.04 foot radius curve to the left whose long chord bears S03°25'44"W, 49.14 feet; Thence S01°02'03"W, 105.94 feet along said Westerly right-of-way line to the point of beginning.

Parcel contains 992,239 Sq. Feet (22.779 Acres), more or less, and is intended to include all lands lying between the meander line and the centerline of a navigable waterway, being the Westerly line of said Lot 1, and is subject to all easements and restrictions of record.

That such plat is a correct representation of all exterior boundaries of the lands surveyed and the division thereof made; That I have made such survey, land division, and plat by the direction of the Redevelopment Authority of the City of Green Bay; That I have fully complied with the provisions of Chapter 236, section 236.34 of the Wisconsin State Statutes, and the land division ordinances of the City of Green Bay in surveying, dividing, and mapping the same.

Troy M. Collins  
Professional Land Survey S-2995

Dated

SURVEYOR'S NOTES:

This Certified Survey Map is contained wholly within the following:

|                |                                                  |                    |
|----------------|--------------------------------------------------|--------------------|
| Tax Parcel No: | Owner:                                           | Recorded Document: |
| 23-243-1       | Redevelopment Authority of the City of Green Bay | 2979230            |

Title search completed on Parcel 23-243-1 by Lighthouse Title, Inc., File No. WGB23-10314358.

RESTRICTIVE COVENANTS:

- Each lot owner shall grade the property abutting a street to conform to the adopted sidewalk grade elevation and maintain said elevation for future sidewalks.
- The land on all side and rear lot lines shall be graded by the subdivider and maintained by the property owner to provide for adequate drainage of surface water.



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Project No: 2022-0399  
Drawn By: TMC  
Sheet No: 5 of 6

PRELIMINARY  
2-27-24

CERTIFIED SURVEY MAP

ALL OF LOT 1 OF VOLUME 53 OF CERTIFIED SURVEY MAPS PAGE 221, MAP NO. 7758,  
RECORDED AS DOCUMENT NO. 2350722, BEING PART OF PRIVATE CLAIMS 9 AND 10,  
EAST SIDE FOX RIVER, CITY OF GREEN BAY, BROWN COUNTY, WISCONSIN

OWNER'S CERTIFICATE:

As owner, I hereby certify that I have caused the lands described on this Certified Survey Map to be surveyed, divided, dedicated and mapped as represented hereon. I also certify that this Certified Survey Map is required to be submitted to the following for approval or objection: City of Green Bay and Brown County.

Gary J. Delveaux  
Chair, Redevelopment Authority of the City of Green Bay

Dated

State of Wisconsin)  
County of Brown) ss

Personally, came before me this day of , 2024, the above named Gary J. Delveaux, to me known to be the person who executed the foregoing instrument and hereby acknowledge the same.

, Notary Public, , County, Wisconsin.

My commission expires .

CITY OF GREEN BAY CLERK CERTIFICATE OF APPROVAL:

As duly appointed clerk for the City of Green Bay, I hereby certify that the records in our office show no unredeemed taxes and no unpaid special assessments affecting any of the lands included on this Certified Survey Map as of the date listed below:

Celestine Jeffreys  
City Clerk

Dated

CITY OF GREEN BAY PLAN COMMISSION CERTIFICATE OF APPROVAL:

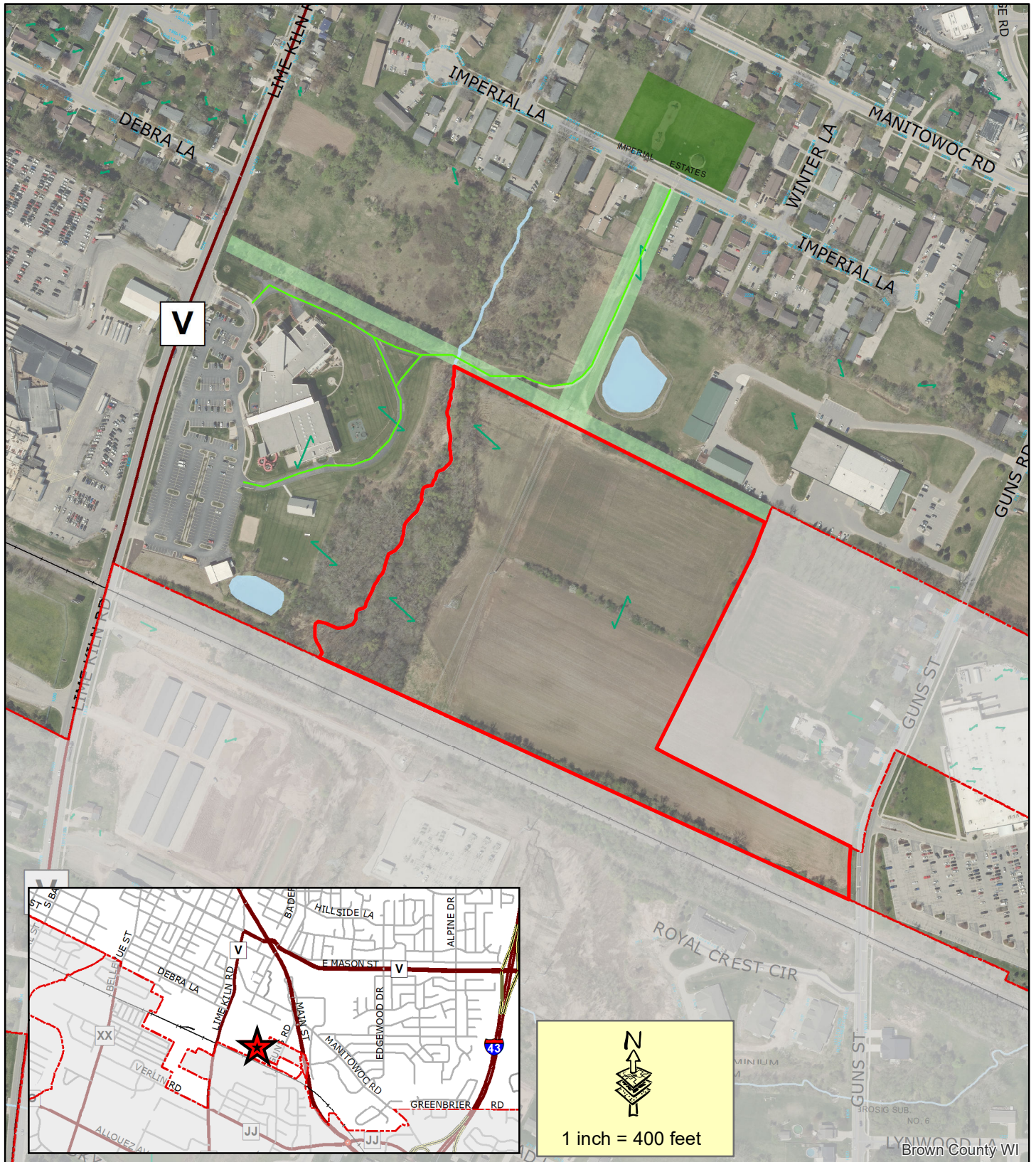
This Certified Survey Map here in the City of Green Bay is hereby approved by the City of Green Bay Plan Commission. I hereby certify that the foregoing instrument is in conformity with the action of the city of green bay plan commission.

Cheryl Renier-Wigg  
Community and Economic Development Director

Dated







**Subject Area**

This is a compilation of records and data located in various City of Green Bay offices and is to be used for reference purposes only. The City of Green Bay is not responsible for any inaccuracies or unauthorized use of the information contained within. No warranties are implied. Map prepared by DM.

**Land Division Petition  
(CSM 24-07)  
0 Lime Kiln Road  
Parcel 23-243-1**



**PLANNING ORDINANCE NO. 01-24**

**AN ORDINANCE  
APPROVING A FOUR-LOT CERTIFIED SURVEY MAP  
AT 0 LIME KILN ROAD  
(CSM 24-07)**

THE COMMON COUNCIL OF THE CITY OF GREEN BAY DOES ORDAIN AS FOLLOWS:

**SECTION 1.** Pursuant to Section 34-2, GBMC, and the recommendation of the Plan Commission on March 15, 2024, a Certified Survey Map is hereby approved for the following described property located at 0 Lime Kiln Road as depicted in the map attached hereto as Exhibit A and made a part of this ordinance as though fully set forth herein.

All of Lot 1 of Volume 53 of Certified Survey Maps Page 221, Map No. 7758, Recorded as Document No. 2350722, Being Part of Private Claims 9 and 10, East Side Fox River, City of Green Bay, Brown County, Wisconsin. (Parcel No. 23-243-1)

Said approval is subject to the following conditions:

1. The Certified Survey Map must comply with all land division review comments prior to being recorded.
2. Compliance with all regulations of the Green Bay Municipal Code.

**SECTION 2.** Approval of said Certified Survey Map is deemed an amendment to the Official Map of the City of Green Bay in accordance with Wis. Stats. § 62.23(6)(d), as it includes the location of new planned streets. Pursuant to Section 34-2, GBMC, and the recommendation of the Plan Commission on March 15, 2024, and following the public hearing held on said amendment on April 16, 2024, the Official Map of the City of Green Bay is hereby amended as depicted in the map attached as Exhibit A.

**SECTION 3.** All ordinances or parts of ordinances in conflict herewith are hereby repealed.

**SECTION 4.** This ordinance shall not take effect until after a public hearing is held on April 16, 2024, and the adoption and publication of this ordinance.

Dated at Green Bay, Wisconsin, this \_\_\_\_\_ day of \_\_\_\_\_, 2024.

APPROVED:

\_\_\_\_\_  
Eric Genrich, Mayor

ATTEST:

\_\_\_\_\_  
Celestine Jeffreys, Clerk

dam

Attachments – Certified Survey Map





## Report to the Green Bay Plan Commission

### MEETING DATE

March 15, 2024

### PREPARED BY

Dena Mooney, Staff

### AGENDA ITEM # E.4

(VR 23-05) Consideration with possible action on the request to amend VR 23-05 to include deviations from Sections 36-415 and 36-416 of the Green Bay Municipal Code for the extension of Hinkle Street in the proposed Southwest Woods Subdivision, submitted by Garritt Bader related to property owned by GB HMC West Mason LLC, Schaetz Family LLC, and the Green Bay Parks Department (Ald. M. Eck, District 11).

### BACKGROUND

**Reason for Request:** To amend previously approved VR 23-05 to include two additional land division variance items. The request is to allow a 100' curvature of centerline on a collector street, where 200' is required (Section 36-415) and to allow an 88.61' reverse curve tangent, where 100' is required (Section 36-416) for the extension of Hinkle Street in the proposed Southwest Woods Subdivision.

**Subject Parcel Zoning and Land Use:** Subject land area is zoned Planned Unit Development (PUD). Land area along the W. Mason Street Frontage is developed with commercial and service businesses and the remainder of the land area is undeveloped.

**Surrounding Zoning and Land Uses:**

**NORTH:** Highway Commercial (C2), Miscellaneous retail and service businesses; Comm. Center Commercial (C3)

**SOUTH:** Public Institutional (PI), Community Park

**EAST:** General Commercial (C1), Retail and service businesses and undeveloped

**WEST:** Highway Commercial (C2), Miscellaneous retail and service businesses; General Commercial (C1), Single-, two- and multi-family residential; Low Density Residential (R-1)

**Comprehensive Plan:** The 2022 Smart Growth Plan designates commercial uses on the northern side of the subject area and high intensity retail, office or housing uses on the southern and eastern portion.

**Report:** The Plan Commission and City Council have the authority to approve variations to the specific requirements of the Subdivision and Platting Ordinance. See the code language below.

Section 36-457 of the Subdivision and Platting Ordinance dictates when the Plan Commission and Common Council find that extraordinary hardship or injustice will result from strict compliance with this ordinance, the terms may vary to the extent deemed necessary and proper to grant relief, provided that the modification meets the following standards:

- The modification is due to physical features of the site or its location.
- The modification is the least deviation from this ordinance, which will mitigate the hardship.
- The modification is not detrimental to the public interest and is in keeping with the general spirit and intent of this ordinance.
- Modifications may also be granted for a complete community or neighborhood unit that provides adequate public spaces and improvement for the circulation, recreation, light, air, and service needs when

fully developed and populated.

e. The requirement of filing and recording the plat or survey shall not be waived.

f. Any modification thus granted shall be entered in the minutes of the Council, along with the reasons which, in the opinion of the Council, justified the modification.

On January 8, 2024, the Plan Commission recommended approval of 10 land division variances for the proposed Southwest Woods subdivision. On March 5, 2024, City Council approved the request. As a reminder, the development is proposed to include the extension of Hinkle Street from W. Mason Street to Hobart Drive, creation of a new public street referred to as Southwest Vie Court, creating lots for 8 attached single-family home sites (townhomes) and 8 single-family home lots.

When the initial land division variance came before Plan Commission, the version of the plat submitted and presented to the Plan Commission by the developer hadn't gone through the formal land division review process. Therefore, the additional variances needed were unknown at that time. Since then, the plat has been reviewed and additional comments related to the extension of Hinkle Street have been identified as shared on February 16 (Amended Preliminary Plat) and March 8 (Pre-Final Plat). The developer had to relocate a portion of the extension of Hinkle Street to avoid the Penny Jar Condominium property (aka Chili's). The street reconfiguration has caused the need for two additional variances that were not part of the original variance application the Plan Commission reviewed. The two additional land division variances are:

1. Curvature of centerline on a collector street is reduced from 200 feet to 100 feet along future Hinkle Street extension (Sec. 36-415).
2. Reduce the minimum required length of a reverse curve tangent from 100 feet to 88.61 feet along future Hinkle Street extension (Sec. 36-416).

Staff has spoken to the Department of Public Works and they have no objection to the additional variances.

## RECOMMENDATION

Staff recommends approval of the request.

## FISCAL IMPACT

## ATTACHMENTS

1. CP 23-03 Revised Southwest Woods Pre-Final Plat
2. VR 23-05 Resolution - Amendment March 2024







**RESOLUTION AUTHORIZING AMENDMENTS  
TO A LAND DIVISION VARIANCE TO  
ALLOW FOR THE DEVELOPMENT OF A MIXED-USE  
NEIGHBORHOOD AND EXTENSION OF HINKLE STREET  
FROM W. MASON STREET TO HOBART DRIVE  
(VR 23-05)**

**March 19, 2024**

BY THE COMMON COUNCIL OF THE CITY OF GREEN BAY, RESOLVED:

That, pursuant to an amendment of the Variance Request 23-05 which was approved by Common Council on March 5, 2024 and the recommendation of the amended land division variance amendment which the Plan Commission on March 15, 2024 recommended approval, the City of Green Bay does authorize additional variances from various Sections of Chapter 36-Subdivision and Platting, Green Bay Municipal Code, as follows:

1. Curvature of centerline on a collector street is reduced from 200 feet to 100 feet along future Hinkle Street extension (Sec. 36-415).
2. Reduce the minimum required length of a reverse curve tangent from 100 feet to 88.61 feet along future Hinkle Street extension (Sec. 36-416).

Subdivision variances will be located on the following described property at 2405 W Mason St (parcel 6H-1109), 0 W Mason St (parcel 6H-1109-2), 0 Ninth St (parcel 6H-1089), 0 Ninth Street (parcel 6H-1091), and 0 W Mason Street (parcel 6H-1109-3):

2405 W. Mason Street, Parcel number 6H-1109: Lot 2, Certified Survey Map No. 9023, Document No. 2851838; said map being part of Lot 14, Section 29, Township 24 North, Range 20 East, City of Green Bay, West side of Fox River, Brown County, Wisconsin. Area contains 102,087 square feet / 2.344 acres more or less.

0 W. Mason Street, Parcel number 6H-1109-2: Outlot 1, Certified Survey Map No. 9023, Document No. 2851838; said map being part of Lot 14, Section 29, Township 24 North, Range 20 East, City of Green Bay, West side of Fox River, Brown County, Wisconsin. Area contains 104,429 square feet / 2.397 acres more or less.

0 Ninth Street, Parcel number 6H-1089: Part of Lots 7 and 8, Section 28, Township 24 North, Range 20 East, Except Streets and Part of Vacated Street described in Jacket 10917, Image 37 and Except 27539 Image 44, City of Green Bay, West side of Fox River, Brown County, Wisconsin.

Commencing at the Southwest corner of Section 28, Township 24 North, Range 20 East; thence North 0°28'07" West, 1319.89 feet along the West line of said Section 28, to the point of beginning; thence North 1° 09'07" West, 692.59 feet along said West line; thence North 88° 42'50" East, 1169.26 feet along the North line of Lot 7; thence South 1° 16'50" East, 893.50 feet to the North line of Beaver Dam Creek Conservancy Area; thence South 41° 38'48" West, 205.37 feet along said Conservancy; thence 462.67 feet along the arc of a 1659.12 foot radius curve to the right whose long chord bears South 49° 44'04" West, 461.17 feet along said Conservancy; thence



North 34° 00'47" West, 179.59 feet; thence 289.27 feet along the arc of a 495.00 foot radius curve to the right whose long chord bears North 17° 14'27" West, 285.18 feet; thence North 0° 28'07" West, 214.66 feet; thence South 88° 52'53" West, 500.00 feet to the point of beginning. Area contains 722,094 square feet / 16.577 acres more or less.

0 Ninth Street, Parcel number 6H-1091: That part of Lots 9 and 10, Section 28 Township 24 North, Range 20 East, Lying Northerly of Beaver Dam Creek Conservancy Area, EXCEPT Volume 781 of Records Page 471 and EXCEPT Jacket 27639 Image 44, City of Green Bay, West of Fox River, Brown County, Wisconsin.

Commencing at the Southwest corner of Section 28, Township 24 North, Range 20 East; thence North 0°28'07" West, 1319.89 feet along the West line of said Section 28, to the point of beginning; thence North 1° 09'07" West, 692.59 feet along said West line; thence North 88° 42'50" East, 1169.26 feet along the North line of Lot 7; thence South 1° 16'50" East, 893.50 feet to the North line of Beaver Dam Creek Conservancy Area; thence South 41° 38'48" West, 205.37 feet along said Conservancy; thence 462.67 feet along the arc of a 1659.12 foot radius curve to the right whose long chord bears South 49° 44'04" West, 461.17 feet along said Conservancy; thence North 34° 00'47" West, 179.59 feet; thence 289.27 feet along the arc of a 495.00 foot radius curve to the right whose long chord bears North 17° 14'27" West, 285.18 feet; thence North 0° 28'07" West, 214.66 feet; thence South 88° 52'53" West, 500.00 feet to the point of beginning. area contains 307,315 square feet / 7.055 acres more or less.

0 W. Mason Street, Parcel number 6H-1109-3: Outlot 2, Certified Survey Map No. 9023, recorded in the Register of Deeds Office for Brown County, Wisconsin, as Document No. 2851838; said map being part of Lot 14, Section 29, Township 24 North, Range 20 East, City of Green Bay, West side of Fox River, Brown County, Wisconsin.

Adopted \_\_\_\_\_

Approved \_\_\_\_\_

\_\_\_\_\_  
Eric Genrich, Mayor

\_\_\_\_\_  
Celestine Jeffreys, Clerk

dm

Attachments (Plat)



## Report to the Green Bay Plan Commission

### MEETING DATE

March 15, 2024

### PREPARED BY

### AGENDA ITEM # F.I

Director's report.

### BACKGROUND

### RECOMMENDATION

### FISCAL IMPACT

### ATTACHMENTS

- I. Development Tracking PUBLIC 20240311





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### City of Green Bay Development Tracker - March 2024

| #  | Project Name              | Developer                  | Project Location             | Project Description                                                                  | Status Update                                                                                                                                | Housing Units |           | Est. Prop Value |
|----|---------------------------|----------------------------|------------------------------|--------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|---------------|-----------|-----------------|
|    |                           |                            |                              |                                                                                      |                                                                                                                                              | Total #       | Under 80% |                 |
| 1  | Merge @ Shipyard          | Merge LLC                  | 239 Arndt Street             | Market multi-family rental, retail                                                   | CSM underway. PUD approved 2/6/24. Construction starting August 2024.                                                                        | 225           | 0         | \$21,000,000    |
| 2  | City East Apartments      | City East Apartments, LLC. | 1165 E Walnut                | Affordable multi-family rental, United Way office                                    | Construction underway                                                                                                                        | 43            | 36        | \$11,627,300    |
| 3  | Bay City Lofts            | Bay City Lofts, LLC.       | 2510 University Ave          | Affordable multi-family rental                                                       | Construction underway                                                                                                                        | 48            | 40        | \$14,125,500    |
| 4  | 200 N. Monroe             | 200 N. Monroe PropCo LLC   | 200 N. Monroe                | Market rate multi-family rental, ground floor commercial                             | DA amendment under review                                                                                                                    | 172           | TBD       | \$22,000,000    |
| 5  | JBS                       | City/RDA                   | 0 Lime Kiln Rd               | Destination park, mixed housing, urban farm                                          | Development RFP reissued - due late March. Road and utility construction to begin in spring                                                  | TBD           | TBD       | TBD             |
| 6  | New Land 221 Cherry       | New Land Enterprises       | 221 Cherry                   | Market rate multi-family rental, retail                                              | DA to be considered in April                                                                                                                 | 258           | 0         | \$35,000,000    |
| 7  | Former Badger Sheet Metal | TBD                        | 420 S. Broadway/419 S. Maple | Market rate multi-family rental, fire station, retail, green infrastructure corridor | \$1M EPA Grant awarded. Ad hoc facilities committee approval received in February for fire station/multi-family mixed-use. RFQ due March 18. | TBD           | TBD       | TBD             |
| 8  | The Fort @ Railyard       | TWG                        | 419 Donald Driver Way        | Affordable multi-family rental, retail                                               | Under construction. Completion anticipated Fall 2024                                                                                         | 233           | 187       | \$21,000,000    |
| 9  | Cherry Faith Properties   | DuJuan Cherry              | 436 S. Monroe                | Multi-family rental, ground floor commercial                                         | Planning Option extension considered at March RDA                                                                                            | 33            | 26        | TBD             |
| 10 | 222 Cherry St LLC         | Peter Nugent               | 216-222 Cherry St            | Market rate apts with retail 1st floor                                               | Amendment to DA to be considered                                                                                                             | 71            | 0         | \$9,000,000     |

| PRIMARY USE COLOR KEY |  |
|-----------------------|--|
| Multi-family          |  |
| Single-family         |  |
| Commercial            |  |
| Industrial            |  |
| Public                |  |

| City of Green Bay Development Tracker - March 2024 |                             |                                  |                                                |                                                                          |                                                                                                                                                 |               |           |                 |
|----------------------------------------------------|-----------------------------|----------------------------------|------------------------------------------------|--------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|---------------|-----------|-----------------|
| #                                                  | Project Name                | Developer                        | Project Location                               | Project Description                                                      | Status Update                                                                                                                                   | Housing Units |           | Est. Prop Value |
| 11                                                 | University Ave              | Neighborworks Green Bay          | Near 1120 University Ave                       | 20-24 Unit Complex                                                       | Bidding and Design process. Planning Option extension may be considered at April RDA.                                                           | Total #       | Under 80% | TBD             |
|                                                    |                             |                                  |                                                |                                                                          |                                                                                                                                                 | TBD           | TBD       |                 |
| 12                                                 | 4th Street                  | Neighborworks Green Bay          | 4th Street and Chestnut                        | 7 unit town house development                                            | Finalizing bidding and design. Planning Option expires 03/30/2024                                                                               | Total #       | Under 80% | TBD             |
|                                                    |                             |                                  |                                                |                                                                          |                                                                                                                                                 | 7             | 7         |                 |
| 13                                                 | Mary and Gallagher          | Neighborworks Green Bay          | Mary St and Gallagher St                       | Housing                                                                  | PO Expired. Neighborworks to meet with DPW on infrastructure needs before proceeding.                                                           | Total #       | Under 80% | TBD             |
|                                                    |                             |                                  |                                                |                                                                          |                                                                                                                                                 | TBD           | TBD       |                 |
| 14                                                 | 1035 Vandertbraak           | Danna Capital, Horizon           | 1035 Vanderbraak & Corner Vanderbraak and Clay | 52 Unit affordable housing multi story & Stacked Townhomes               | Developer preparing development proposal and is seeking financing. PO Expires 5/14/2024                                                         | Total #       | Under 80% | TBD             |
|                                                    |                             |                                  |                                                |                                                                          |                                                                                                                                                 | 52            | TBD       |                 |
| 15                                                 | Pulliam Redevelopment       | Port of Green Bay / Brown County | 420 S. Broadway/419 S. Maple                   | Port development / C. Reiss relocation                                   | Engineering underway for Pulliam improvements                                                                                                   | Total #       | Under 80% | TBD             |
|                                                    |                             |                                  |                                                |                                                                          |                                                                                                                                                 | NA            | NA        |                 |
| 16                                                 | Carnivore                   | Lanny Viegut                     | 3757 Vital Pl                                  | Industrial - pet food processing                                         | Partial occupancy 12/20/23 . Phase 2 to be complete 3/31/24                                                                                     | Total #       | Under 80% | \$35,000,000    |
|                                                    |                             |                                  |                                                |                                                                          |                                                                                                                                                 | NA            | NA        |                 |
| 17                                                 | Grandview Project #2        |                                  | 3855 Finger Rd                                 | Industrial                                                               | Design phase. PO Expires 8/6/24                                                                                                                 | Total #       | Under 80% | TBD             |
|                                                    |                             |                                  |                                                |                                                                          |                                                                                                                                                 | NA            | NA        |                 |
| 18                                                 | Shipyard Phase I            | City/RDA                         | 100 W. Mason, 239 Arndt                        | Riverfront promenade, pier, docks, kayak launch, habitat, site utilities | Under construction. Completion anticipated July 2024. Phase 2 grant and Shipyard DA amendment to be considered in March                         | Total #       | Under 80% | NA              |
|                                                    |                             |                                  |                                                |                                                                          |                                                                                                                                                 | NA            | NA        |                 |
| 19                                                 | Parking Lot F Redevelopment | On Broadway, Inc                 | 300 block North Broadway                       | Parking ramp, likely with multi-family housing                           | Planning option to expire 5/1/24.                                                                                                               | Total #       | Under 80% | TBD             |
|                                                    |                             |                                  |                                                |                                                                          |                                                                                                                                                 | TBD           | TBD       |                 |
| 20                                                 | Schauer & Schumacher        | 33 Investments LLC               | 227 E Walnut, 101 & 109 N Adams St             | Event venue, speakeasy and boutique hotel                                | Developer finalizing financing. Planning option expires 3/13/24                                                                                 | Total #       | Under 80% | TBD             |
|                                                    |                             |                                  |                                                |                                                                          |                                                                                                                                                 | NA            | NA        |                 |
| 21                                                 | Green Bay Plaza             | ICAP Development                 | 1555 W. Mason                                  | Commercial                                                               | RDA to consider Development Agreement in March for public infrastructure (water) investments to support creation of new commercial developments | Total #       | Under 80% | \$4,000,000.00  |
|                                                    |                             |                                  |                                                |                                                                          |                                                                                                                                                 | NA            | NA        |                 |
| 22                                                 | Southwest Woods             | GB Real Estate Investments       | Hinkle south of Mason                          | Single-family houses and townhomes with road extension                   | Development Agreement to be considered by RDA in March. TIF requested for public infrastructure.                                                | Total #       | Under 80% | \$8,000,000     |
|                                                    |                             |                                  |                                                |                                                                          |                                                                                                                                                 | 29            | 0         |                 |

| PRIMARY USE COLOR KEY |               |
|-----------------------|---------------|
|                       | Multi-family  |
|                       | Single-family |
|                       | Commercial    |
|                       | Industrial    |
|                       | Public        |



## City of Green Bay Development Tracker - March 2024

| #  | Project Name       | Developer                               | Project Location   | Project Description                                                  | Status Update                                                 | Housing Units |           | Est. Prop Value |
|----|--------------------|-----------------------------------------|--------------------|----------------------------------------------------------------------|---------------------------------------------------------------|---------------|-----------|-----------------|
| 23 | Veterans Village   | Veterans First                          | 2890 Anthony Drive | Cottage Court development for veterans                               | PUD application submitted - item held                         | Total #       | Under 80% | TBD             |
|    |                    |                                         |                    |                                                                      |                                                               | 21            | 21        |                 |
| 24 | 1915 Harold St.    | LeMense                                 | 1915 Harold St     | Single family, owner occupied home                                   | DA approved, expires 12/31/2024                               | Total #       | Under 80% | \$198,300       |
|    |                    |                                         |                    |                                                                      |                                                               | 1             | 0         |                 |
| 25 | 445 S Baird St     | Deals, Development, Partnership Capital | 445 S Baird St     | Single family, owner occupied home                                   | Completion anticipated Fall 2024                              | Total #       | Under 80% | \$243,000       |
|    |                    |                                         |                    |                                                                      |                                                               | 1             | 0         |                 |
| 26 | 929 N Broadway     | Neighborworks Green Bay                 | 929 N Broadway     | Single family, owner occupied home                                   | PO Expires 03/12/2024                                         | Total #       | Under 80% | TBD             |
|    |                    |                                         |                    |                                                                      |                                                               | 1             | 1         |                 |
| 27 | 1162 & 1164 Day St | Neighborworks Green Bay                 | 1162 & 1164 Day St | Single family, owner occupied home on each lot                       | DA Expires 12/31/2024                                         | Total #       | Under 80% | \$500,000       |
|    |                    |                                         |                    |                                                                      |                                                               | 2             | 1         |                 |
| 28 | 1008 Smith St.     | Habitat for Humanity                    | 1008 Smith Street  | Affordable single-family                                             | DA expires 12/31/2024                                         | Total #       | Under 80% | \$240,000       |
|    |                    |                                         |                    |                                                                      |                                                               | 1             | 1         |                 |
| 29 | 1132 Harvey St.    | Habitat for Humanity                    | 1132 Harvey Street | Affordable single-family                                             | DA expires 12/31/2024                                         | Total #       | Under 80% | \$250,000       |
|    |                    |                                         |                    |                                                                      |                                                               | 1             | 1         |                 |
| 30 | 1151 Reber St.     | Habitat for Humanity                    | 1151 Reber Street  | Affordable single-family                                             | DA expires 12/31/2024                                         | Total #       | Under 80% | \$250,000       |
|    |                    |                                         |                    |                                                                      |                                                               | 1             | 1         |                 |
| 31 | Habitat Homestead  | Habitat for Humanity                    | 0 Richmond Street  | Affordable single-family owner occupied detached homes and townhomes | Predevelopment, road install start and groundbreaking in fall | Total #       | Under 80% | \$2,925,000     |
|    |                    |                                         |                    |                                                                      |                                                               | 14            |           |                 |

| PRIMARY USE COLOR KEY |               |
|-----------------------|---------------|
|                       | Multi-family  |
|                       | Single-family |
|                       | Commercial    |
|                       | Industrial    |
|                       | Public        |