AGENDA
JEFFERSON COUNTY PLANNING AND ZONING COMMITTEE
DECISION MEETING

George Jaeckel, Chair; Steve Nass, Vice-Chair; Blane Poulson, Secretary; Matt Foelker, Cassie Richardson

SUBJECT: Planning and Zoning Committee Decision Meeting
DATE: Monday, February 26, 2024
TIME: 8:30 a.m.
PLACE: Room C1021, County Courthouse, Jefferson WI

YOU MAY ATTEND VIRTUALLY BY FOLLOWING THESE INSTRUCTIONS:

Register in advance for this meeting:
https://zoom.us/meeting/register/tJEkf--hpj4pHd2y7-u8i9MUTAbnqMB_1Qxy
Meeting ID: 959 8698 5379
Passcode: Zoning
After registering, you will receive a confirmation email containing information about joining the meeting

1. Call to Order
2. Roll Call (Establish a Quorum)
3. Certification of Compliance with Open Meetings Law
4. Approval of the Agenda
5. Public Comment (Not to exceed 15 minutes and not to include petitions slated for decision. Members of the public who wish to address the Committee on specific agenda items must register their request at this time)
6. Approval of January 29, February 9, and February 15 meeting minutes
7. Communications
8. November Monthly Financial Report for Register of Deeds
9. November Monthly Financial Report for Land Information Office
10. December Monthly Financial Report for Zoning
11. Discussion on Solar Energy Facilities
    a. Crawfish River Solar
    b. Badger State River
    c. Sinnissippi Solar
12. Discussion on WE Energies Liquified Natural Gas (LNG) Facility in the Town of Ixonia
13. Discussion on Livestock Siting Technical Review Committee for ATCP 51
14. Discussion and Possible Action on the yearly review of **CU2058-20 – Paul E Elliott/Dianne M Owens** for agricultural tourism, retail sales of agricultural related items and a wine tasting room located a N7040 Saucer Dr in the Town of Farmington.
15. Discussion and Possible Action on **CU2075-22 – Hebron Holdings LLC** for an eating and drinking facility at N2349 County Road D, PIN 010-0515-0224-015 in the Town of Hebron for a report and follow up on the parking plan
16. Discussion and Possible Action on **R4513A-23 – Land Hunter LLC**, PIN 008-0715-2333-000 in the Town of Farmington previously tabled for a redesign of the proposed 2 acre lot
17. Discussion and Possible Action for a holding tank waiver for a new construction on **Rock River Paradise**, PINs 032-0815-2411-014 and 032-0815-2411-015, in the Town of Watertown owned by Chrisopher Mueller
18. Discussion and Possible Action for a lot line adjustment at **N3509 W Cedar Road** in the Town of Oakland on PINs 022-0613-1913-000 and 022-0613-1913-001 owned by Roger Lehmann Trust
19. Discussion and Possible Action on Petitions Presented in Public Hearing on February 15, 2024:

R4518A-24 – William S Ehrke Trust: Create a 1-ac A-3 residential building site from part of PIN 022-0613-1434-000 (50.711 Ac) located off **Ehrke Road** in the Town of Oakland. This is in accordance with Sec. 11.04(f)8 of the Jefferson County Zoning Ordinance.

R4519A-24 – Adam I Adsit: Create an approximate 2.3-ac A-3 residential building site from part of PIN 024-0516-3532-002 (32.44 Ac) located at **N231/N299 Tamarack Rd** in the Town of Palmyra. This is in accordance with Sec. 11.04(f)8 of the Jefferson County Zoning Ordinance.

R4520A-24 – John K & M Michelle Mehring: Create (1) 1.1-ac and (2) 1.5-ac A-3 residential building sites from part of PIN 024-0516-3342-001 (18.46 Ac) located at **N252/N254 County Road H** in the Town of Palmyra. This is in accordance with Sec. 11.04(f)8 of the Jefferson County Zoning Ordinance.

CU2117-24 – Keegan T/Sarah M Wedl: Conditional use for storage of contractor's equipment in an A-2 zone on PIN 002-0714-3311-002 (1.314 Ac) located at **N5201 Popp Rd** in the Town of Aztalan. This is in accordance with Sec. 11.04(f)7 of the Jefferson County Zoning Ordinance.

CU2118-24 – KF Pellatt LLC: Conditional use to allow for a construction contracting business in a Business zone on PIN 016-0514-1043-026 located at **N1806 US Highway 12** in the Town of Koshkonong. This is in accordance with Sec. 11.04(f)3 of the Jefferson County Zoning Ordinance.

CU2119-24 – Teresa Peterson: Conditional use for a conditional home occupation for the sale of plants in an A-3 zone on PIN 030-0813-2823-002 (4.00 Ac) located at **W8889 Stoney Brook Rd** in the Town of Waterloo. This is in accordance with Sec. 11.04(f)8 of the Jefferson County Zoning Ordinance.

20. Planning and Development Department Update
21. Possible Future Agenda Items
22. Upcoming Meeting Dates:
    March 15, 8:00 a.m. – Site Inspections leaving from Courthouse Room C1049
    March 21, 7:00 p.m. – Public Hearing in Courthouse Room C2063
    March 25, 8:30 a.m. – Decision Meeting in Courthouse Room C1021
    April 12, 8:00 a.m. – Site Inspections – 8:00 a.m. – Site Inspections leaving from Courthouse Room C1049
    April 18, 7:00 p.m. – Public Hearing, 8:30 a.m. – Public Hearing in Courthouse Room C2063
    April 29, 8:30 a.m. – Decision Meeting in Courthouse Room C1021
23. Adjourn

If you have questions regarding the petitions, please contact the Zoning Department at 920-674-7131. Petition files referenced on this agenda may be viewed in Courthouse Room C1040 at 311 S Center Ave between the hours of 8:00 a.m. and 4:30 p.m., Monday through Friday, excluding holidays. Materials covering other agenda items can be found at www.jeffersoncountywi.gov.

A quorum of any Jefferson County Committee, Board, Commission, or other body, including the Jefferson County Board of Supervisors, may be present at this meeting.

Individuals requiring special accommodations for attendance at the meeting should contact the County Administrator at 920-674-7101 at least 24 hours prior to the meeting so that appropriate arrangements can be made.

A digital recording of the meeting will be available in the Zoning Department upon request**.**

MINUTES OF THE
JEFFERSON COUNTY PLANNING AND ZONING COMMITTEE
SITE INSPECTIONS

George Jaeckel, Chair; Steve Nass, Vice-Chair; Blane Poulson, Secretary; Matt Foelker, Cassie Richardson

SUBJECT: Planning and Zoning Committee Site Inspections
DATE: February 9, 2024
TIME: 8:00 a.m.
PLACE: **Jefferson County Courthouse, 311 S. Center Ave., Jefferson, WI**
Room C1021

1. Call to Order
The meeting was called to order by Supervisor Nass at 8:07 a.m.

2. Roll Call (Establish a Quorum)
Committee members present were Supervisors Nass, Poulson, Foelker, and Richardson. Supervisor Jaeckel was absent and excused. Also present were Zoning Department staff members Brett Scherer and Sarah Elsner.

3. Certification of Compliance with Open Meetings Law
Poulson verified that the meeting was being held in compliance with Open Meetings Law.

4. Approval of the Agenda
Motion by Supervisors Poulson/Foelker to approve the agenda. Motion passed 4-0.

5. Public Comment (Not to exceed 15 minutes and not to include petitions slated for decision. Members of the public who wish to address the Committee on specific agenda items must register their request at this time)
There was no public comment.

6. Communications
There were no communications.

The Committee left for the following site inspections:

7. Site Inspections for Petitions to be Presented in Public Hearing on February 15, 2024:

R4518A-24 – William S Ehrke Trust: Create a 1-ac A-3 residential building site from part of PIN 022-0613-1434-000 (50.711 Ac) located off **Ehrke Road** in the Town of Oakland. This is in accordance with Sec. 11.04(f)8 of the Jefferson County Zoning Ordinance.

CU2118-24 – KF Pellatt LLC: Conditional use to allow for a construction contracting business in a Business zone on PIN 016-0514-1043-026 located at **N1806 US Highway 12** in the Town of Koshkonong. This is in accordance with Sec. 11.04(f)3 of the Jefferson County Zoning Ordinance.

R4519A-24 – Adam I Adsit: Create an approximate 2.3-ac A-3 residential building site from part of PIN 024-0516-3532-002 (32.44 Ac) located at **N231/N299 Tamarack Rd** in the Town of Palmyra. This is in accordance with Sec. 11.04(f)8 of the Jefferson County Zoning Ordinance.

R4520A-24 – John K & M Michelle Mehring: Create (1) 1.1-ac and (2) 1.5-ac A-3 residential building sites from part of PIN 024-0516-3342-001 (18.46 Ac) located at **N252/N254 County Road H** in the Town of Palmyra. This is in accordance with Sec. 11.04(f)8 of the Jefferson County Zoning Ordinance.

Site inspection for an agricultural tourism space at N7040 Saucer Dr, Town of Farmington for Dianne Owens/Paul Elliott, PIN 008-0715-0232-001.

CU2119-24 – Teresa Peterson: Conditional use for a conditional home occupation for the sale of plants in an A-3 zone on PIN 030-0813-2823-002 (4.00 Ac) located at **W8889 Stoney Brook Rd** in the Town of Waterloo. This is in accordance with Sec. 11.04(f)8 of the Jefferson County Zoning Ordinance.

CU2117-24 – Keegan T/Sarah M Wedl: Conditional use for storage of contractor's equipment in an A-2 zone on PIN 002-0714-3311-002 (1.314 Ac) located at **N5201 Popp Rd** in the Town of Aztalan. This is in accordance with Sec. 11.04(f)7 of the Jefferson County Zoning Ordinance.

8. **Adjourn**

Motion by Supervisors Foelker/Nass to adjourn the meeting. Motion passed 4-0 and the meeting was adjourned at 10:55 a.m.

If you have questions regarding the petitions, please contact the Zoning Department at 920-674-7131. Petition files referenced on this agenda may be viewed in Courthouse Room 201 between the hours of 8:00 a.m. and 4:30 p.m., Monday through Friday, excluding holidays. Materials covering other agenda items can be found at www.jeffersoncountywi.gov.

A quorum of any Jefferson County Committee, Board, Commission, or other body, including the Jefferson County Board of Supervisors, may be present at this meeting.

Individuals requiring special accommodations for attendance at the meeting should contact the County Administrator at 920-674-7101 at least 24 hours prior to the meeting so that appropriate arrangements can be made.

A digital recording of the meeting will be available in the Zoning Department upon request.

NOTICE OF PUBLIC HEARING
JEFFERSON COUNTY PLANNING AND ZONING COMMITTEE

George Jaeckel, Chair; Steve Nass, Vice-Chair; Blane Poulson, Secretary; Matt Foelker; Cassie Richardson

SUBJECT: Map Amendments to the Jefferson County Zoning Ordinance and Requests for Conditional Use Permits
DATE: Thursday, February 15, 2024
TIME: 7:00 p.m. (Doors will open at 6:30)

PLACE: **JEFFERSON COUNTY COURTHOUSE, ROOM C2063**
311 S. CENTER AVE, JEFFERSON, WI 53549
OR Via Zoom Videoconference

PETITIONERS OR MEMBERS OF THE PUBLIC MAY ATTEND THE MEETING VIRTUALLY BY FOLLOWING THESE INSTRUCTIONS IF THEY CHOOSE NOT TO ATTEND IN PERSON:

You are invited to a Zoom meeting.
When: February 15, 2024, at 07:00 PM Central Time (US and Canada)
Meeting ID: 957 3344 0565
Passcode: Zoning
Register in advance for this meeting:
https://zoom.us/j/95733440565?pwd=eHZRbHZXWXhlUnlKdkhtOXhoTmtNZz09
After registering, you will receive a confirmation email containing information about joining the meeting.

1. Call to Order

- The meeting was called to order by Chairman Jaeckel at 7:02pm.

2. Roll Call

- All members of the Committee were present at 7:02pm. Also present were Sarah Elsner and Brett Scherer from the Zoning Department. Attending via Zoom was Kevin Pellatt.

3. Certification of Compliance with Open Meetings Law

- Supervisor Poulson verified that the meeting was being held in compliance with Open Meetings Law.

4. Approval of Agenda

-Motion by Supervisors Poulson/Foelker to approve the agenda. Motion passed 5-0.

5. Explanation of Public Hearing Process by Committee Chair

- Chairman Jaeckel explained the process.

6. Public Hearing

NOTICE IS HEREBY GIVEN that the Jefferson County Planning and Zoning Committee will conduct a public hearing at 7 p.m. on Thursday, February 15, 2024, in Room C2063 of the Jefferson County Courthouse, Jefferson, Wisconsin. Members of the public will be allowed to be heard regarding any petition under consideration by the Planning and Zoning Committee. **PETITIONERS, OR THEIR REPRESENTATIVES SHALL BE PRESENT EITHER IN PERSON OR VIA ZOOM.** Matters to be heard are petitions to amend the official zoning map and applications for conditional use permits. A map of the properties affected may be obtained from the Zoning Department. Individual files, which include staff finding of fact, are available for viewing between the hours of 8 a.m. and 4:30 p.m., Monday through Friday, except holidays. If you have questions regarding these matters, please contact Zoning at 920-674-7131.

DECISIONS ON THE <u>CONDITIONAL USES ONLY</u> WILL BE MADE ON FEBRUARY 26, 2024
DECISIONS ON THE REZONINGS WILL BE MADE ON MARCH 12, 2024

FROM A-1 TO A-3, AGRICULTURAL/RURAL RESIDENTIAL

<u>R4518A-24 – William S Ehrke Trust:</u> Create a 1-ac A-3 residential building site from part of PIN 022-0613-1434-000 (50.711 Ac) located off **Ehrke Road** in the Town of Oakland. This is in accordance with Sec. 11.04(f)8 of the Jefferson County Zoning Ordinance.

PETITIONER: Cindy Pitzner (N4977 Popp Road) spoke as the petitioner for this rezone. The petitioner is looking to zone a site off to build a new home.

COMMENTS IN FAVOR: None.

COMMENTS OPPOSED: None.

REBUTTAL: None.

QUESTIONS FROM COMMITTEE: None.

STAFF: Given by Elsner and in the file.

TOWN: In favor.

R4519A-24 – Adam I Adsit: Create an approximate 2.3-ac A-3 residential building site from part of PIN 024-0516-3532-002 (32.44 Ac) located at **N231/N299 Tamarack Rd** in the Town of Palmyra. This is in accordance with Sec. 11.04(f)8 of the Jefferson County Zoning Ordinance.

PETITIONER: Adam Adsit (231 Tamarack Road) presented himself as the petitioner for this rezone. The petitioner is looking at splitting off a building site to create a homesite.

COMMENTS IN FAVOR: Frank Sauter (N1405 State Road 106) spoke in favor of the petition. Sauter said he is on the Town Board for Palmyra and the board is in full approval.

COMMENTS OPPOSED: None.

REBUTTAL: None.

QUESTIONS FROM COMMITTEE: None.

STAFF: Given by Elsner and in the file.

TOWN: In favor.

FROM I TO A-3, AGRICULTURAL/RURAL RESIDENTIAL

R4520A-24 – John K & M Michelle Mehring: Create (1) 1.1-ac and (2) 1.5-ac A-3 residential building sites from part of PIN 024-0516-3342-001 (18.46 Ac) located at **N252/N254 County Road H** in the Town of Palmyra. This is in accordance with Sec. 11.04(f)8 of the Jefferson County Zoning Ordinance.

PETITIONER: John Mehring (714 S Third Street) presented himself as the petitioner for this rezone. Mehring said he is looking to create 3 building sites for his family. Mehring said the property is zoned Industrial and would be better for the environment to have building sites instead of an industrial use. Mehring also spoke about the DNR approval and surrounding neighbors are all in favor. Mehring provided documentation for both.

COMMENTS IN FAVOR:
-Frank Sauter (N1405 State Road 106) spoke in favor of the petition. Sauter said he is on the Town Board for Palmyra and the board is in full approval.
-Terri Orchard (W137 Little Prairie Road) spoke on behalf of herself and her husband. Both were in favor of the petition. Orchard said the homes are good fit for the area and would increate the tax revenue for the area.
-Elsner read one email in support of the petition. The email is in the file.

COMMENTS OPPOSED: Elsner read all letters and emails in opposition. All letters are in the file.

REBUTTAL: Mehring spoke on that majority of the opposition are not from the area. He said everyone on the street and surrounding roads of the proposed lot were in favor. Mehring said what is proposed will help protect the area, rather than turning the area into an industrial use. Mehring said they are looking to have as minimal disturbance to the sites as possible.

QUESTIONS FROM COMMITTEE: Nass asked about the slopes and environmental corridor. Mehring explained the slopes were man made for a ski hill. He said that the slopes in the proposed area are not natural slopes. Mehring gave the committee a map regarding the slopes.

STAFF: Elsner responded to Nass regarding the environmental corridor. Find of Fact was given by Elsner and in the file. Elsner stated that this is the same request and layout from the 2021 Rezoning Petition.

TOWN: In favor.

CONDITIONAL USE PERMIT APPLICATIONS

CU2117-24 – Keegan T/Sarah M Wedl: Conditional use for storage of contractor's equipment in an A-2 zone on PIN 002-0714-3311-002 (1.314 Ac) located at **N5201 Popp Rd** in the Town of Aztalan. This is in accordance with Sec. 11.04(f)7 of the Jefferson County Zoning Ordinance.

PETITIONER: Keegan Wedl (N5201 Popp Road) presented himself as the petitioner. The petitioner said the zone is already zoned A-2, and he is looking to have a storage structure for his business on the property.

COMMENTS IN FAVOR: None.

COMMENTS OPPOSED: None.

REBUTTAL: None.

QUESTIONS FROM COMMITTEE: None.

STAFF: Given by Elsner and in the file. Elsner asked what will stored inside? The petitioner said trailers, equipment, materials, and other business-related items. Elsner asked if the proposed structure would have bathrooms? The petitioner said not at this time. Elsner asked if there is any outdoor lighting? The petitioner said most likely not. Elsner asked

TOWN: In favor.

CU2118-24 – KF Pellatt LLC: Conditional use to allow for a construction contracting business in a Business zone on PIN 016-0514-1043-026 located at **N1806 US Highway 12** in the Town of Koshkonong. This is in accordance with Sec. 11.04(f)3 of the Jefferson County Zoning Ordinance.

PETITIONER: Kevin Pellatt (239 Jefferson Street) presented himself as the petitioner for this conditional use. The petitioner is looking to use the building for a design and remodeling business. The petitioner said it would be very similar to the previous use of the building and property.

COMMENTS IN FAVOR: None.

COMMENTS OPPOSED: None.

REBUTTAL: None.

QUESTIONS FROM COMMITTEE: None.

STAFF: Given by Elsner and in the file. Elsner asked the petitioner to give a brief overview of the business plan on the property. The petitioner said there would be 2-6 employees onsite and hours would be from 8am to 5pm and 5 days a week. The petitioner said there would be no additional lighting or signage.

TOWN: In favor.

CU2119-24 – Teresa Peterson: Conditional use for a conditional home occupation for the sale of plants in an A-3 zone on PIN 030-0813-2823-002 (4.00 Ac) located at **W8889 Stoney Brook Rd** in the Town of Waterloo. This is in accordance with Sec. 11.04(f)8 of the Jefferson County Zoning Ordinance.

PETITIONER: Teresa Peterson (W8889 Stoney Brook Road) presented herself as the petitioner for this conditional use. The petitioner is looking for a conditional use to grow and sell hastas and perennials plants on Saturdays and Sundays.

COMMENTS IN FAVOR: None.

COMMENTS OPPOSED: None.

REBUTTAL: None.

QUESTIONS FROM COMMITTEE: None.

STAFF: Given by Elsner and in the file.

TOWN: In favor.

7. **Adjourn**

- Supervisor Poulson moved to adjourn 7:38 p.m. and was seconded by Supervisor Foelker. Motion passed 5-0 on a voice vote.

A quorum of any Jefferson County Committee, Board, Commission or other body, including the Jefferson County Board of Supervisors, may be present at this meeting.

Individuals requiring special accommodations for attendance at this meeting should contact the County Administrator 24 hours prior to the meeting at 920-674-7101 so appropriate arrangements can be made.

A digital recording of the meeting will be available in the Zoning Department upon request.

MINUTES OF THE
JEFFERSON COUNTY PLANNING AND ZONING COMMITTEE
DECISION MEETING

George Jaeckel, Chair; Steve Nass, Vice-Chair; Blane Poulson, Secretary; Matt Foelker, Cassie Richardson

SUBJECT: Planning and Zoning Committee Decision Meeting
DATE: Monday, January 29, 2024
TIME: 8:30 a.m.
PLACE: Room C1021, County Courthouse, Jefferson WI

YOU MAY ATTEND VIRTUALLY BY FOLLOWING THESE INSTRUCTIONS:

Register in advance for this meeting:
https://zoom.us/meeting/register/tJEkf--hpj4pHd2y7-u8i9MUTAbnqMB_1Qxy
Meeting ID: 959 8698 5379
Passcode: Zoning
After registering, you will receive a confirmation email containing information about joining the meeting

1. **Call to Order**
   The meeting was called to order by Chairman Jaeckel at 8:30 a.m.

2. **Roll Call (Establish a Quorum)**
   Supervisors Jaeckel, Nass, Poulson, and Richardson were present. Supervisor Foelker was absent and excused. Other County staff in attendance were Ben Wehmeier, Staci Hoffman, Patricia Cicero, and Supervisor Anita Martin. Zoning Department staff present were Matt Zangl, Sarah Elsner, and Brett Scherer. Attending via Zoom were Supervisor Walt Christensen, Michael Luckey, Brian Udovich, Mason Steffes, and Lianna Spencer.

3. **Certification of Compliance with Open Meetings Law**
   Supervisor Poulson verified compliance with Open Meetings Law.

4. **Approval of the Agenda**
   Supervisors Poulson/Richardson motioned to approve the agenda as proposed. Motion passed 4-0.

5. **Public Comment (Not to exceed 15 minutes and not to include petitions slated for decision. Members of the public who wish to address the Committee on specific agenda items must register their request at this time.)** Supervisor Martin asked that a future agenda item be added regarding the ATCP51 State Law advisory Committee update.

6. **Approval of December 28, January 18, and January 19 meeting minutes**
   Motion by Supervisors Poulson/Richardson to approve the December 28 meeting minutes. Motion passed 4-0.
   Motion by Supervisors Richardson /Poulson to approve the January 18 meeting minutes. Motion passed 4-0.
   Motion by Supervisors Poulson/Jaeckel to approve the January 19 meeting minutes. Motion passed 4-0.

7. **November Monthly Financial Report for Register of Deeds**
   Hoffman explained last year's budget was met even with recordings down; transfer fees helped meet budget. Hoffman also explained that the Judicial Security Bill is moving forward at the State which proposes that the information of judges is shielded from public view. Zangl also address this bill and what it would mean for the Land Information Department. There is also a proposition for recording fees to be increased to $45 instead of $30.

8. **November Monthly Financial Report for Land Information Office**
   Zangl explained that everything is status quo, and the department is about where they need to be on budget.

9. **December Monthly Financial Report for Zoning**
   Zangl reported a retirement for the department and that budget should come in about the same, possibly slightly over.

10. **Discussion on Solar Energy Facilities**
    a. Crawfish River Solar
       Zangl reported that they are still in the construction phase and the date for the noise study may be adjusted to be done at a different time with PSC approval. The information collected will be helpful for future projects.
    b. Badger State River
       Zangl reported that construction will not start this year and there will be a request sent to the PSC for another extension.

Zangl and Wehmeier also spoke on the Sinnissippi Solar project. Zangl referenced a letter included in the Committee packet and noted that they will be looking for a different location for office space. Wehmeier reported that the project will be smaller than originally planned and will be to the west of the river. There will be more information to come later.

11. **Discussion on WE Energies Liquified Natural Gas (LNG) Facility in the Town of Ixonia**
    Zangl reported that construction is winding down and testing and operation phases will start soon. Vegetation requirements will be met in spring.

12. **Discussion on a Solar Energy Systems Ordinance**
    Zangl reported he will meet with Corp Counsel soon to discuss the ordinance. Supervisor Poulson questioned the ability to restrict prime ground for development and push non-PSC projects towards non-prime land. Wehmeier spoke in response to Supervisor Poulson's statement.

13. **Discussion and Possible Action on R4497A-23 – Mitch & Julia Brock/Scott & Jill Johnson Property and Violation VIO071-2023.**
    Zangl gave an overview of the rezone and violation and reported that there has been no change in the property since last discussed. Discussion took place regarding financial burden, a physical plan with a deadline being provided to ensure clean-up of the property, and fair treatment of all property owners in the County. Motion by Supervisors Poulson/Jaeckel for Johnson to provide a plan with dates to remove the junk from the property. Motion passed 4-0.

14. **Discussion and Possible Action on Petitions Presented in Public Hearing on January 18, 2024:**

    PLEASE SEE INDIVIDUAL FILES FOR A COMPLETE RECORD OF THE FOLLOWING DECISIONS:

APPROVE WITH CONDITIONS BOTH <u>R4510A-24 & CU2114-24 – Richard Wenzlick/John & Marian MacDonald Property:</u> Create a 0.25-ac lot with conditional use for a cemetery on PIN 026-0616-3322-000 (40 ac) in the Town of Sullivan near **W1650 County Rd CI.** This is in accordance with Sec. 11.04(f)7 of the Jefferson County Zoning Ordinance. Motion by Supervisors Nass/Richardson for rezone. Motion passed 4-0. Motion by Supervisors Poulson/Nass for conditional use. Motion passed 4-0.

APPROVE WITH CONDITIONS <u>R4511A-24 – Kenyon Bliss/Bliss & Bjorklund, and KKKK LLC, Owners:</u> Rezone all of PIN 006-0716-0113-004 (1.22 ac) owned by Kenyon Bliss and Jacquelynn Bjorklund, and 0.146-ac of PIN 006-0716-0113-000 (28.93 ac) owned by KKKK LLC to create a 1.366-ac lot at **W246 Allen Rd,** Town of Concord. This is in accordance with Sec. 11.04(f)8 of the Jefferson County Zoning Ordinance. Motion by Supervisors Nass/Richardson. Motion passed 4-0.

APPROVE WITH CONDITIONS <u>R4512A-24 – Land Hunter LLC:</u> Create a 2-ac farm consolidation lot around the home at **N5724 N Helenville Rd,** Town of Farmington from part of PIN 008-0715-2333-000 (24.464 ac). This is in accordance with Sec. 11.04(f)8 of the Jefferson County Zoning Ordinance. Motion by Supervisors Nass/Jaeckel. Motion passed 4-0.

POSTPONE FOR REDESIGN R4513A-24 – Land Hunter LLC: Create a new 2-ac building site along **N Helenville Rd**, Town of Farmington from part of PINs 008-0715-2333-000 (24.464 ac) and 008-0715-2622-000 (20 ac). This is in accordance with Sec. 11.04(f)8 of the Jefferson County Zoning Ordinance. Motion by Supervisors Nass/Jaeckel. Motion passed 4-0.

POSTPONE FOR REDESIGN R4514A-24 – Nicholas & Melanie Brock: Rezone 1.061 ac of PIN 016-0514-1344-002 (10.71 ac) for a new building site on **Carnes Rd** in the Town of Koshkonong. This is in accordance with Sec. 11.04(f)8 of the Jefferson County Zoning Ordinance. Motion by Supervisors Nass/Richardson. Motion passed 4-0.

APPROVE WITH CONDITIONS R4515A-24 – Hartwick Brothers LLC: Create a new 2-ac building site from part of PINs 010-0615-3522-000 (10.284 ac) and 010-0615-3523-001 (20 ac) in the Town of Hebron on **County Rd D**. This will replace one of the lots approved by Petition R3365A-08 and is in accordance with Sec. 11.04(f)8 of the Jefferson County Zoning Ordinance. Motion by Supervisors Nass/Jaeckel. Motion passed 4-0.

APPROVE WTH CONDITIONS R4516A-24 – Hartwick Brothers LLC: Rezone for a farm consolidation lot around the home at **N2768 County Rd D** in the Town of Hebron, on PIN 010-0615-3523-001 (20 ac). This is in accordance with Sec. 11.04(f)8 of the Jefferson County Zoning Ordinance. Motion by Supervisors Nass/Jaeckel. Motion passed 4-0.

APPROVE WITH CONDITIONS R4517A-24 – Hartwick Brothers LLC: Create a 16.6-ac Natural Resource zone from part of PINs 010-0615-3523-001 (20 ac), 010-0615-3524-000 (40 ac) and 010-0615-3513-001 (10 ac) along **County Rd D** in the Town of Hebron. This is in accordance with Sec. 11.04(f)12 of the Jefferson County Zoning Ordinance. Motion by Nass/Jaeckel. Motion passed 4-0.

APPROVE WITH CONDITIONS CU2115-24 – Mason Steffes/Badgerland Homes LLC, Owner: Conditional use for a duplex in a Community zone on PIN 012-0816-2513-052 (0.427 ac) on **Madison Ave** in the Town of Ixonia. This is in accordance with Sec. 11.04(f)9 of the Jefferson County Zoning Ordinance. Motion by Supervisors Jaeckel/Poulson. Motion passed 4-0.

APPROVE WITH CONDITIONS CU2116-24 – Jeff Ciardo: Conditional use for a duplex in a Residential R-2 zone on PIN 016-0514-3514-013 (0.475 ac) at the intersection of **Oak Clay Dr and Twinkling Star Rd** in the Town of Koshkonong. This is in accordance with Sec. 11.04(f)2 of the Jefferson County Zoning Ordinance. Motion by Supervisors **Nass**/Jaeckel. Motion passed 4-0.

15. Possible Future Agenda Items

16. Upcoming Meeting Dates:
February 9, 8:00 a.m. – Site Inspections – 8:00 a.m. – Site Inspections leaving from Courthouse Room C1049
February 15, 7:00 p.m. – Public Hearing, 8:30 a.m. – Public Hearing in Courthouse Room C2063
February 26, 8:30 a.m. – Decision Meeting in Courthouse Room C1021
March 15, 8:00 a.m. – Site Inspections leaving from Courthouse Room C1049
March 21, 7:00 p.m. – Public Hearing in Courthouse Room C2063
March 25, 8:30 a.m. – Decision Meeting in Courthouse Room C1021

16. Adjourn
Motion by Supervisors Jaeckel/Nass to adjourn the meeting. Motion passed 4-0, and the meeting adjourned at 9:35 a.m.

If you have questions regarding the petitions, please contact the Zoning Department at 920-674-7131. Petition files referenced on this agenda may be viewed in Courthouse Room C1040 at 311 S Center Ave between the hours of 8:00 a.m. and 4:30 p.m., Monday through Friday, excluding holidays. Materials covering other agenda items can be found at www.jeffersoncountywi.gov.

A quorum of any Jefferson County Committee, Board, Commission, or other body, including the Jefferson County Board of Supervisors, may be present at this meeting.

Individuals requiring special accommodations for attendance at the meeting should contact the County Administrator at 920-674-7101 at least 24 hours prior to the meeting so that appropriate arrangements can be made.

A digital recording of the meeting will be available in the Zoning Department upon request**.**

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Review

Agrivoltaic, a Synergistic Co-Location of Agricultural and Energy Production in Perpetual Mutation: A Comprehensive Review

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Abstract: Agrivoltaic systems, which consist of the combination of energy production by means of photovoltaic systems and agricultural production in the same area, have emerged as a promising solution to the constraints related to the reduction in cultivated areas due to solar panels used in agricultural production systems. They also enable optimization of land use and reduction in conflicts over land access, in order to meet the increasing demand for agricultural products and energy resulting from rapid population growth. However, the selected installation configurations, such as elevation, spacing, tilt, and choice of panel technology used, can have a negative impact on agricultural and/or energy production. Thus, this paper addresses the need for a review that provides a clear explanation of agrivoltaics, including the factors that impact agricultural and energy production in agrivoltaic systems, types of panel configurations and technologies to optimize these systems, and a synthesis of modelling studies which have already been conducted in this area. Several studies have been carried out in this field to find the appropriate mounting height and spacing of the solar panels that optimize crop yields, as this later can be reduced by the shade created with the solar panels on the plants. It was reported that yields have been reduced by 62% to 3% for more than 80% of the tested crops. To this end, an optimization model can be developed to determine the optimal elevation, spacing, and tilt angle of the solar panels. This model would take into account factors that influence crop growth and yield, as well as factors that affect the performance of the photovoltaic system, with the goal of maximizing both crop yield and energy production.

Keywords: energy-water-agriculture nexus; agrivoltaics; combined model; optimization; arrangement; yields

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1. Introduction

Of all natural resources, water, energy, and food are the most essential to sustain life on earth [1,2]. Water, energy, and food share common challenges of limited accessibility, increasing global demand, and sustainability constraints [3]. Moreover, these essential resources are expected to face a significant surge in demand due to rapid population growth, in order to meet the basic needs of the population [4]. Indeed, according to UN projections, the world's population will increase from 8.5 billion in 2030 to 9.7 billion in 2050 and reach about 10.4 billion in the 2080s [5]. Moreover, according to the FAO [6], agricultural production will have to be doubled to meet demand in developing countries, while these countries will have to face constraints related to increased competition for access to water and energy and the impacts of climate change. To this end, it has been predicted that production needs to be increased by 60% [7] or even doubled to meet the

population's needs in the face of population growth and changing diets [8]. The major constraints to agricultural development are related to access to water and energy for irrigation. Irrigation is the controlled delivery of water for agriculture through artificial systems to meet water needs not met by rainfall for crop growth and development [9]. Sophisticated and water-efficient irrigation techniques have significantly increased energy requirements. The energy cost required to operate these systems compromises the viability of many irrigation networks [10]. To this end, new perspectives have emerged, namely the use of renewable energy in irrigation systems as an alternative to pumping systems powered by fossil fuels [11,12], bearing in mind that the high cost of fuels and the lack of electricity, especially in rural areas, are factors that negatively affect the functioning of irrigation systems [13]. Solar PV panels are utilized due to their environmental benefits, cost-effectiveness, and ability to address issues of fossil fuel scarcity and unavailability in certain regions. The energy sector has seen significant and accelerated progress in terms of innovations observed with the use of renewable energy. A total of 20% of global energy consumption in the world comes from renewables, and about 30% of investment in renewables is in wind power and 60% in solar power [14].

Solar photovoltaic energy has emerged as an environmentally friendly and economically viable alternative with lower energy costs [9,13]. In addition, photovoltaic panels are among the leading renewable energy technologies in the world and have seen continuous decrease in costs over the years. It is predicted that 25% of the electricity needed in 2050 will come from solar PV, with a reduction of 4.9 Gt of CO_2 corresponding to a 21% decrease in emissions in the energy sector [15].

Nevertheless, using solar panels to pump water for irrigation can significantly reduce cultivated areas due to the space occupied by the solar panels [16]. One solution to this problem is, therefore, the adoption of agrivoltaic systems. These dual-use systems involve raising the PV panels to use the space under the panels for agricultural purposes [17]. Thus, this system reduces the issue of conflicts regarding land access [18,19]. Agrivoltaics can also significantly reduce the constraints on access to electricity for populations. According to Jamil et al. [20], agrivoltaic practices on only 1% of cultivated land can satisfy the energy demands of at least one-quarter of the population in Canada. However, solar panels installed in an area can impact microclimate, temperature, and solar radiation distribution, water, biodiversity, air quality, and ecosystem-energy balances [21,22]. Given the impact of solar panels on crops, several studies have investigated the optimal panel layout to maximize crop production in the presence of the panels. These studies have mainly focused on determining the height and spacing of the panels to create a suitable environment for crops under the panels. However, these arrangements were determined through studies that primarily focused on the irradiation received under the PV array and the resulting shading on the crops, with specific arrangements being tested [23–25]. Other studies have examined panel orientation through field experiments [26]. Kim et al. [27] worked on modeling the hybrid performance of an agrivoltaic system in South Korea. Their model focused on the variation of the amount of electricity generated and the crop yield obtained based on the incident radiation, as well as the impact of atmospheric conditions on the radiation. Three different shading ratios were tested to compare the levels of shading (21.3%, 25.6%, and 32%), with the shading ratio calculated as the panel area divided by the system area. A height of 5.42 m was used for all three tests and the shading rate was based on the density of the modules. However, there is still limited research and decision-making tools to determine the appropriate configuration for the crop being grown. Thus, modeling studies to determine the optimal height, spacing, and inclination of the panels to maximize growth and development for a given crop and the performance of the panels would help users to find the right configuration.

In order to achieve our purpose, this review focuses on a clear explanation of agrivoltaic systems and the functioning of its different components, as well as the factors that affect each of them. We believe that a large literature review will allow us to identify the most important parameters to consider for the design of the optimization model. The present paper will also summarize the studies carried out on the possible configurations of agrivoltaic systems, as well as the overall successes and failures of the arrangements and orientation.

2. Definition and Terminology

An agrivoltaic practice is a concept that originated in 1980 [23]. It is defined as a land-use concept that directly integrates solar energy production and agricultural activities, which are practiced under the photovoltaic field installation, both of which are highly dependent on sunlight [28]. Agrivoltaics has several names that vary according to region and application, such as "dual-use", "co-location", "agri-PV", "agri-solar", "solar sharing", "pollinator-friendly solar", etc. [29]. Indeed, it is a symbiotic relationship in which both activities interact directly and benefit from this co-location [30]. This practice leads to synergies by optimizing the potential offered by both production systems [31], especially in agroforestry systems [32].

Agrivoltaic practices can be carried out in different ways depending on the activities carried out by the population in a given area (Figure 1). Agrivoltaic applications represent the combination of energy production with (i) agricultural production in the field or (ii) agricultural production in greenhouses or livestock rearing, or (iii) provision of ecosystem services through vegetation management or (iv) different agricultural practices combined [29].

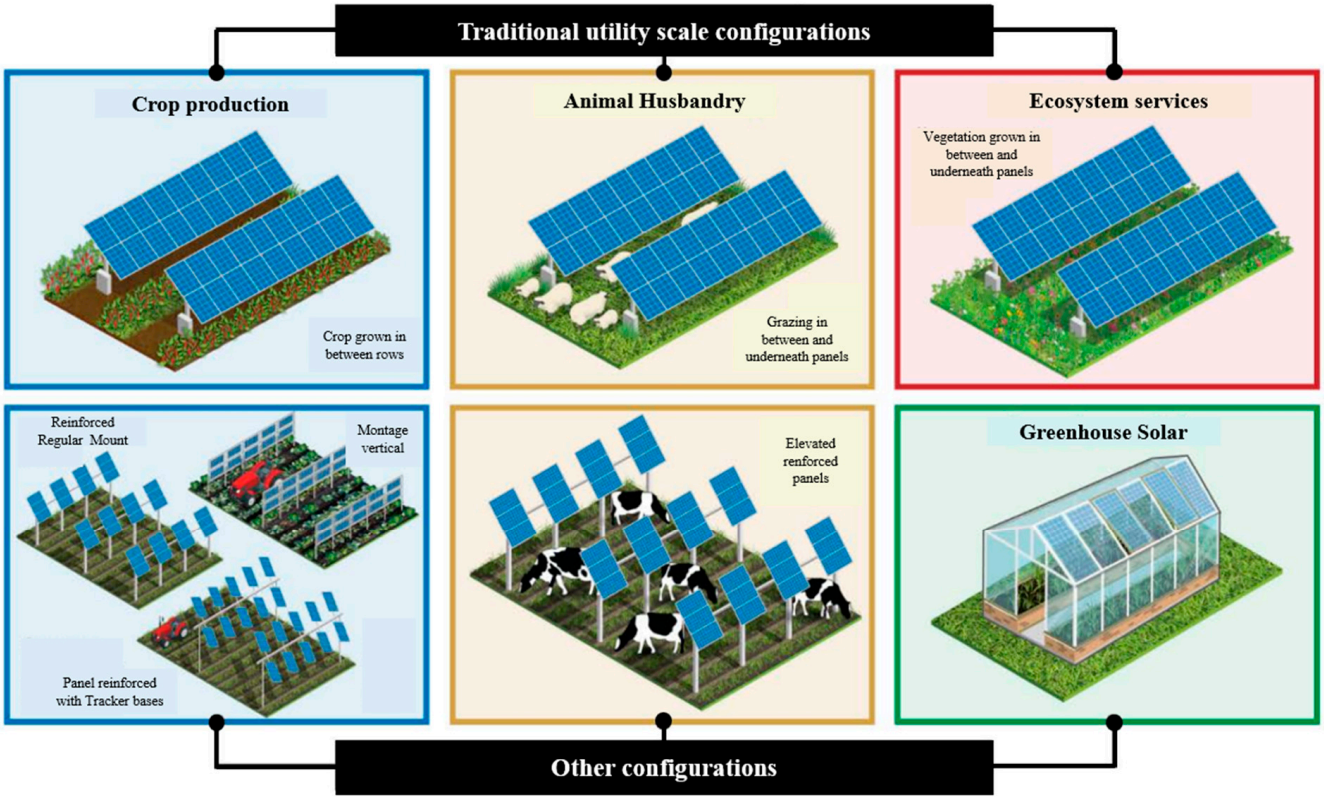

Figure 1. The different agrivoltaic systems [29].

Agrivoltaic technology has an important role in strengthening the water–energy–food relationship [33], given the increasing future need for energy and food production in the face of population demand [34]. Indeed, one of the constraints on the development of PV systems is the increased competition for land due to high population growth and rising food demand [35]. Although land resources are limited, the need for energy and food is increasing, leading to increased competition for land between the two sectors. In response to this growing competition, agrivoltaics was conceived to keep the two activities in balance [36]. Due to their dual use, agrivoltaics would mitigate competition for space and offers the possibility to install large PV systems, while keeping the land accessible for food production [37]. Thus, agrivoltaics system reduces land constraints concerning the placement of solar PV plants for electricity generation [38]. Moreover, this system has proven to be a particularly effective way to increase land use efficiency [32]. Land use efficiency is determined by the so-called parameter Land Equivalence Ratio (LER). The method of measuring land use in integrated agricultural and electricity production systems was originally derived from the intercropping method applied in the farming sector to increase land yield and total income [39]. The LER is a function of the area of the PV system and the total area needed to meet the agricultural and electricity production of the system [40]. Agrivoltaic systems can increase overall land productivity by 35–73%, thus they avoid using land solely for energy production at the expense of agricultural production [41]. According to Lee et al. [42] and Weselek et al. [31], agrivoltaics can increase land productivity by 60–70%, and for Dinesh and Pearce [38], it can increase the economic value of land by more than 30% by minimizing yield losses due to shading effects through appropriate crop selection. According to Trommsdorff et al. [43], land use efficiency varies depending on time and climate. In 2017, the Land Equivalence Ratio (LER) in Germany indicated an increase in land productivity from 56% to 70%, and this value reached 90% during the dry and hot summer of 2018. Abidin et al. [39] reported that applying agrivoltaics to less than 1% of the world's cultivated land could offset the global energy demand. Although agrivoltaics may reduce the efficiency of electricity generation or agriculture when viewed in isolation, studies have shown that the synergy between the two activities can lead to increased overall efficiency. For example, the combination of two hectares of land (1 ha of crops and 1 ha of solar panels each considered individually) corresponds to 100% of crops and 100% of solar energy. However, the use of agrivoltaics in two hectares of land corresponds to 160% cultivation and 160% energy (i.e., 80% of crop and 80% of energy in only 1 ha of land) [39].

As reported by Trommsdorff et al. [43], Formula 1 is used to calculate LER. However, Formula (2) can be used to take into account the high land loss due to the surface occupied by the mounting structure of the solar PV panels.

$$LER = \frac{Yeild_x(dual)}{Yeild_x(mono)} + \frac{Yeild_y(dual)}{Yeild_y(mono)} \quad (1)$$

$$LER = \frac{Yeild_x(dual)}{Yeild_x(mono)} + \frac{Yeild_y(dual)}{Yeild_y(mono)} - 8.3\% \quad (2)$$

x is the cultivated crop and y is the electricity.

3. Solar Panel Installation Techniques to Optimize Agrivoltaic Systems

3.1. Classification of the Different Agrivoltaic Installations

The module configurations in agrivoltaic systems can be categorized into elevated and inter-row systems. The modules are installed above the crop at more than 1.8 m in elevated systems. Growing crops under elevated solar panel installations typically leads to a decrease in the amount of solar radiation they receive, which can cause shading and reduced exposure to sunlight. The main crops used in this type of agrivoltaic system are grapes, small fruit trees, and delicate vegetables. In contrast, inter-row PV systems are systems in which agricultural production is usually carried out in the space between the rows of

panels. The distance between two consecutive rows of the panels can be considerable in this type of installation to facilitate the passage of large agricultural machinery. The most common crops in inter-row solar systems are grasses, hardy vegetables, and higher-value horticultural crops [29]. The different configurations are established to compare their impact on the level of shading created by the panels and their consequences on crop yields to determine the optimal density for an agrivoltaic installation [44]. Another way to increase the efficiency of a PV system is to install double-sided PV panels [45]. Figure 2 summaries the different configurations.

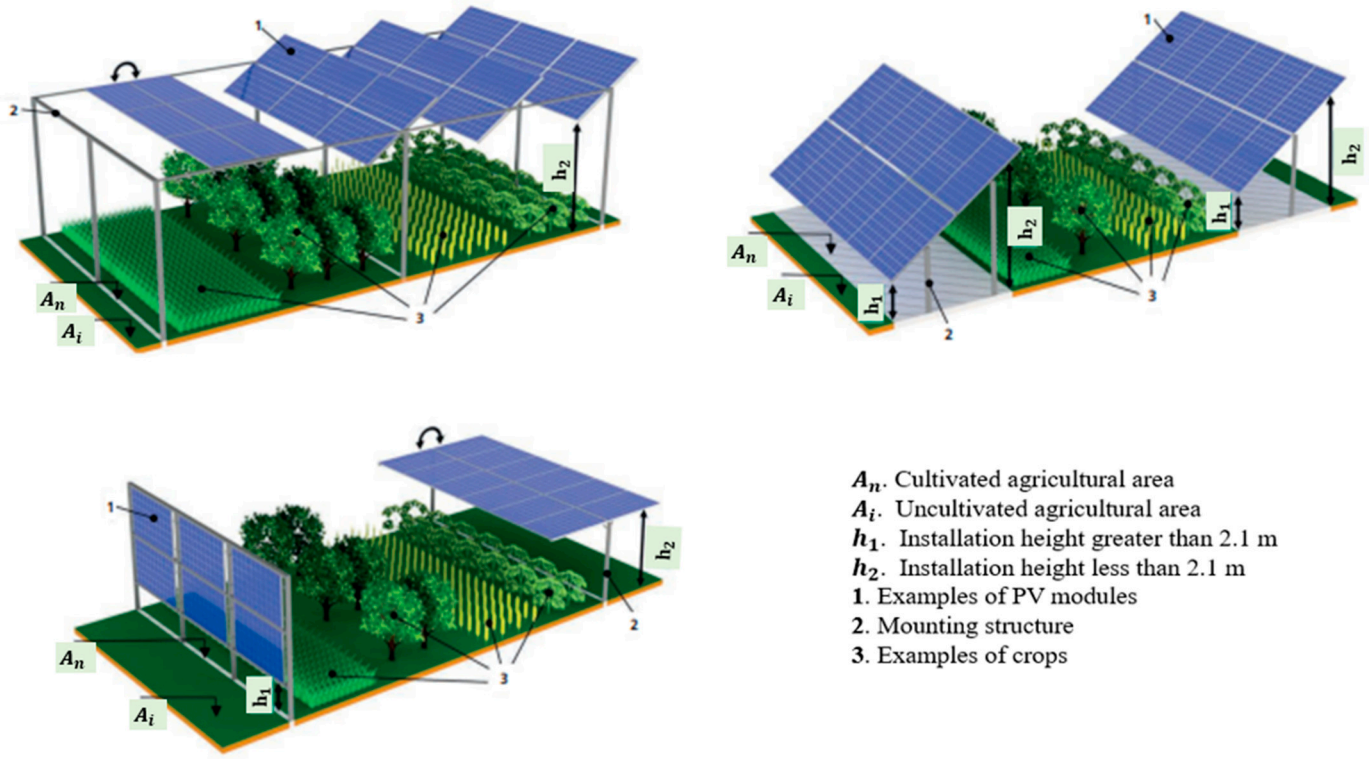

Figure 2. Overview of different configurations of agrivoltaic installations [44].

Several configurations and technologies have been developed and tested to optimize production in agrivoltaic systems. Therefore, the installation must meet the requirements of both the crop and the photovoltaic panels, which can be achieved by using optimal panel spacing and installation height that also allows the passage of agricultural machinery and appropriate panel technology [44]. Macknick et al. [46] have identified three types of approaches for the implementation of agrivoltaic systems: (i) the energy production approach, which focuses on optimizing the solar energy produced (thus minimizing changes in standard solar development practices), while cultivating between and/or under the panels, (ii) the agricultural production approach which focuses on optimizing biomass production (minimizing changes in existing vegetation management activities), while taking energy production into account, and (iii) the integrated agricultural and energy production approach (incorporating vegetation and energy priorities into system design).

These approaches are based on implementing one of the two installation techniques: open agrivoltaic systems, in which the PV module are installed at the ground level via support, and closed agrivoltaic systems, in which the modules are installed on greenhouses, thus serving as a cover [44]. However, only open agrivoltaic systems are considered in this paper. For this purpose, a general classification of the different agrivoltaic systems is proposed in Figure 3.

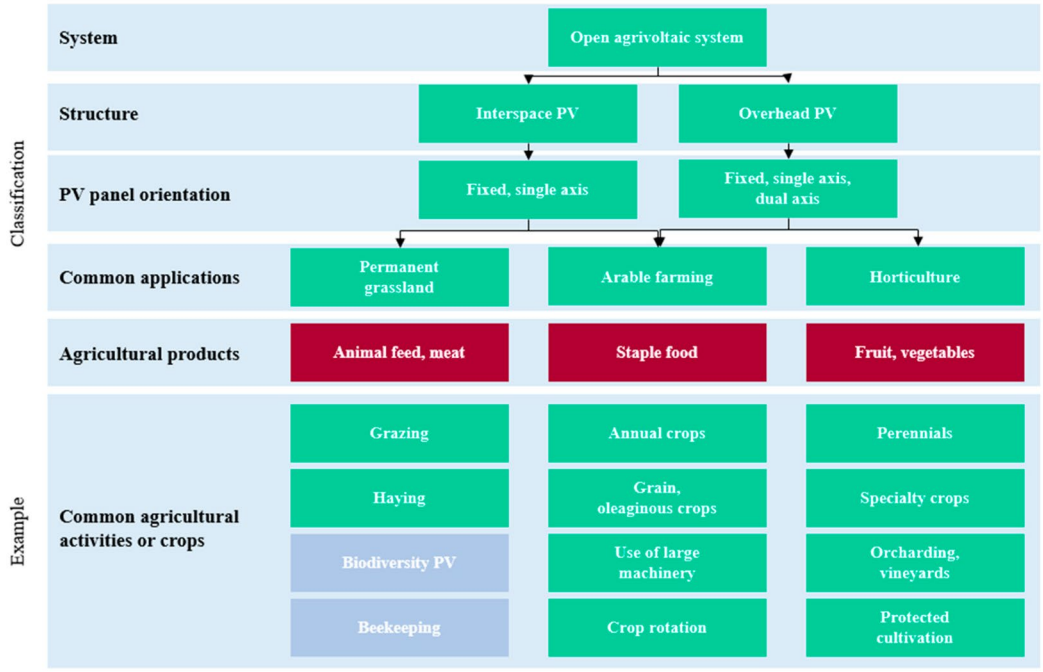

Figure 3. Summary of different agrivoltaic field systems [44,47].

3.2. Installation Techniques to Optimize the Agrivoltaic System

3.2.1. Mounting Height or Overhead of Agrivoltaic Systems Installation

The first agrivoltaic installation in the world was developed by Goetzberger and Zastrow at the Fraunhofer Institute (Germany) in 1980. It employed a height of 2 m and a spacing of 6 m between panel rows [23]. Since then, several studies have been carried out to determine the optimal elevation and spacing of solar photovoltaic modules to maximize energy and agricultural production. The ability of crops to grow and develop underneath PV modules raises structural issues in the case of aerial systems [44]. The height of the panels is an essential factor in the success of the various agrivoltaic practices. However, there are no recommendations for the panels' ideal height for an agrivoltaic installation. The height of the PV panels depends on several factors, including the geographical location of the site, the crop to be cultivated, the soil types, and financial resources. Thus, the height of the panels defines the crop to be grown on the site, the location of the crops in the systems (between the rows of panels or under the PV panels), and the equipment that can be used. Moreso, the solar panels installed in the agrivoltaic systems can have different configurations depending on the climate and soil to protect the structures from certain climatic hazards, namely high winds and freezing. For this purpose, a height of 1.8 m of the tubes supporting the PV panels is considered the minimum viable height for vegetable production under the panels. However, a tube height of 2.4 m is preferable for crops. This is because crops are grown between rows of panels at heights below 1.8 m, except for low-lying crops that appreciate shade. The elevation of the modules promotes a more even distribution of sunlight under the solar PV panels. In addition, these higher installations also allow the movement of equipment and people under the modules [29].

According to Trommsdorff et al. [44], overhead systems should be mounted at a minimum height of 2.1 m from the ground. In 2004, agrivoltaic systems started to be installed in Japan with installation heights of 3 m [31]. Dupraz et al. [24] used a 4 m elevation to assess the impact of this configuration on crop yields at Montpellier in 2010. This height was chosen to ensure access to large agricultural machinery on the site. In Germany, the impact of shading of the panels on crops was studied in 2016 by installing the PV panels at a distance of 5 m from the ground. In the USA, a 3.3 m high system was installed over the same period to assess the impact of agrivoltaic systems in arid environments [33]. Kim et al. [48] investigated the effect of agrivoltaic systems in South Korea using an

elevation of 5.2 m. Several studies were undertaken involving a range of configurations of agrivoltaic systems on different crops [28,38,49–59]. In addition, standard heights of solar panels can be used for sheep grazing whereas higher panel heights are required for cattle grazing [29]. Figure 4 gives two example of elevated agrivoltaic installation.

Figure 4. (**a**) Panels installed at the height of 4 m in Montpellier © Dupraz, (**b**) Panels installed at the height of 5 m in Germany © Fraunhofer ISE [33].

For traditional industrial-scale solar installations, minimal spacing is required between rows to avoid the shading of one onto another, but spacing between PV modules of a same row is not necessary. For an open agrivoltaic system, the spacing between rows on the one hand and the spacing between modules in the same row on the other hand must be carefully determined according to the type of crop. A wide panel spacing increases the capacity and uniformity of solar radiation penetration to the crop, thus reducing the impact of shading from the panels. Spacings tested ranged from 0.2 m [29] to 6.4 m [50]. A typical image concerning the spacing between modules is depicted on Figure 5. The spacing between rows of panels increases the efficiency of elevated agrivoltaic systems (Figure 6). In addition to enhancing the uniformity of solar radiation distribution to the crops, this configuration also increases the number of crop rows under the panels, facilitates the movement of large farm machinery, and increases the space available for farm workers. The spacing between rows in the aerial systems tested in the field ranged from 0.71 m [55] to 9.5 m [58].

Figure 5. Panels spacing for an experiment in the USA [29].

Figure 6. Spacing between rows of panels allowing movement of farm machinery under the PV panels © Fraunhofer ISE [44].

Another method of optimizing elevated agrivoltaic systems is to use an optimal tilt angle and orientation to increase the yield of the solar panels and the crops grown under them (Figure 7). Various tilts and orientations have been tested for different locations for fixed installations. According to Trommsdorff et al. [44], solar tracking modules allow for more flexible light management under the panels. The process of tracking PV systems involves installing a mechanical system that can adjust the orientation and tilt of the modules at different times of the day, with the goal of optimizing energy production. Two categories of solar tracking systems are used: single-axis trackers and dual-axis trackers. In the first configuration, the PV module array tracks the sun horizontally according to its angle of incidence (altitude) or vertically according to its orbit (azimuth). The second configuration combines the two, producing a more significant amount of energy. These mobile systems optimize crop yields through greater light availability during critical growth periods. In addition, the flexibility of the tilt angle provides constructive protection against hail or extreme radiation by adjusting their orientation as required.

(**a**) (**b**)

Figure 7. (**a**) Single-axis solar tracker module [44] and (**b**) dual-axis solar tracker module [60].

One of the main constraints of installing aerial agrivoltaic systems is the high investment and maintenance cost. The wide spacing of the panels can create favorable conditions for crop growth and development, but it leads to a reduction in energy density due to the reduced number of panels installed on the plot. Also, the spacing between rows of panels can increase the investment cost in areas with high land costs and limited land availability [29]. However, these systems face shading constraints [33], so these installations are favorable for viticulture. Moreover, dual-axis systems with large arrays of PV modules can

create shading under the panels, while other parts of the ground surface receive maximum sunlight [44].

3.2.2. Vertically Mounted Agrivoltaic Systems

The mounting of solar panels vertically to the ground is also a method of optimizing agrivoltaic systems (Figure 8). It consists of an installation technique in which the modules are oriented in the east–west direction, which has proved to be more efficient for permanent crops, or in the north–south direction, where energy production is a priority [61]. These systems require a significant distance between consecutive rows of vertical supports. For example, [62] studied vertical arrays using a 10 m spacing between the rows. A report by [26] showed that the yield of oats and potatoes decreased by 50% when the distance between rows was decreased in length from 20 to 5 m. In addition, [26] reported that 10% of the land near the panels does not have to be cultivated and can be used as ecological zones. Bifacial panels are widely used in these systems.

Figure 8. Vertical agrivoltaic installation with bifacial modules in Sued [62].

Vertical panels are favorable to crops as they allow a homogeneous distribution of sunlight, facilitate farm machinery movement, cleaning of solar panels, and access to crop rainwater. It is more economical, as it reduces the support cost, which is lower than that of aerial systems [39]. However, according to Katsikogiannis et al. [61], the constraint of its usage is the reduction in the electrical energy produced. Indeed, these systems allow for a 50% increase in LER and for a 33% reduction in electrical production compared to conventional single PV systems. According to Reagan and Kurtz [63], electrical production can be increased by 10–20% compared to traditional techniques by using a 2 m spacing between the supports, which results in a substantial reduction in crop yield [26].

Table 1 gives the strengths and weaknesses of the different installations.

Table 1. Summary of the strengths and weaknesses of the different installations.

Type of Installation	Strengths	Weakness
Inter-row systems	• Considerable space in this type of installation facilitates the passage of large agricultural machinery • Low investment cost	• Crop yield reduction due to uncultivated space

Table 1. *Cont.*

Type of Installation	Strengths	Weakness
Elevated systems with spacing between rows of panels	• Spacing between rows of panels and between panels enhance the uniformity of solar radiation • Can create crop protection in temperate zones • Crops under panels increase crop yields • Facilitates the movement of large farm machinery • Increases the space available for farm workers	• High investment and maintenance cost • Can create a shadow under the panels • Reduction in energy density due to the reduced number of panels installed
Tracking systems	• Greater light availability during critical growth periods • Constructive protection against hail or extreme radiation	• High investment and maintenance cost • Dual-axis systems with large arrays of PV modules can create irregular distribution of light to crops
Vertical mounting systems	• Homogeneous distribution of sunlight • Facilitate farm machinery movement • Cleaning of solar panels • Access to crop rainwater • Reduced cost of the installation structure • Increased electricity production for small distances between installation structures	• Reduction in agricultural production for small distances between installation structures (2 m) • Reduction in electricity production for large distances between the installation structures (20 m)

4. Factors Affecting the Operation of Photovoltaic Systems

Agrivoltaics relies mainly on the distribution of sunlight for photovoltaic energy production and photosynthesis. Therefore, the solar radiation spectrum is shared between the solar panels and the crops underneath [34]. Indeed, the principle of photovoltaics is the conversion of sunlight into direct current electricity. This production of electrical energy is the result of the absorption of photons from photovoltaic cells exposed to the sun, which in turn release free electrons to produce electrical energy [64–68]. Furthermore, the solar cell is the main component of the solar photovoltaic system [69].

Solar cells can be grouped into four generations based on the specific constituent elements and their periods. The first generation of PV cells is based on silicon wafer technology, including monocrystalline and polycrystalline cells [70]. The cells have an efficiency of between 18% and 20%, depending on the quality of the silicon used. However, according to Blakers et al. [71], the maximum efficiency reported for polycrystalline silicon cells could be as high as 26–27%. The theoretical maximum efficiency of monojunction silicon cells is around 30% and is called the Shockley–Queisser limit. The basic structure of these cells usually consists of a glass front and back cover, encapsulation layers, a solar cell matrix, and solder joints to electrically connect the individual cells [72]. Second-generation solar cells are thin-film cells that have a reduced maximum thickness of a few nanometers or tens of micrometers, compared to first-generation cells. This reduction in thickness helps to decrease the material usage and cost of silicon solar cells. These cells are made of two heterojunction layers squeezed between two contact layers. Efficiencies of 22.6% have been achieved with cadmium telluride (CdTe) thin films [73]. Third-generation cells consist of dye-sensitized solar cells (DSSCs), perovskite, and organic solar cells. DSSCs are limited by the synthesis of organic dyes and their chemical stability. For this reason, perovskite has been used as an alternative to DSSCs, and more than 21% efficiencies have been achieved in a very small area. The fourth-generation tandem solar cells are made of composite materials, consisting of polymers mixed with nanoparticles to have the properties of a single absorbing layer. The tandem solar cell is characterized by a top and bottom solar cell and an intermediate buffer layer. The upper GaAs cells absorb solar radiation, which is then transmitted to the Si of the lower cells [74]. The electrodes extract the generated charge carriers, and a photo-current flows through the thin buffer layer between the two solar cells [75]. The four generations mentioned are shown in Figure 9.

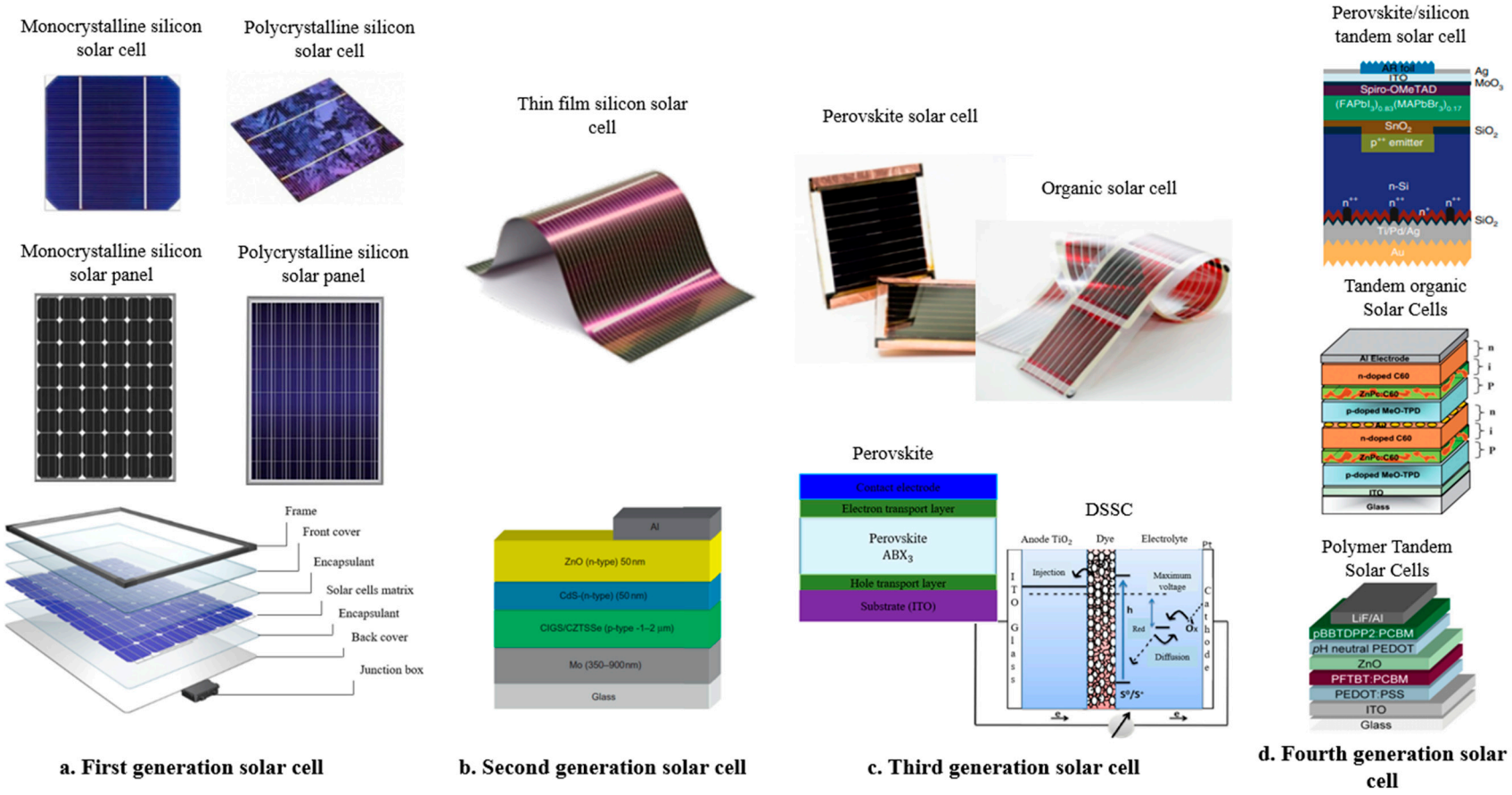

Figure 9. The four different generations of solar cells and their structures [74,76–80].

First-generation solar cells, namely monocrystalline and polycrystalline silicon-based cells, are the most commonly available in the commercial world [74]. According to Zhang et al. [76] and Rabanal-Arabach [77], 80–85% of the panels on the market belong to silicon technology.

In temperate regions with much sunshine, solar radiation is often too intense for some crops, especially in the summer. Shading screens are often installed in the systems to reduce the intensity of this radiation. These are semi-transparent solar panels [28,81,82]. Indeed, different opaque, transparent, and semi-transparent technologies are used in agrivoltaic systems and lead to different changes in sunlight availability throughout the day [29]. Bifacial panels are also widely used in agrivoltaic systems, as they use the light from the ground side (opposite side of the module) to generate electricity. Depending on the level of radiation on the back side, this can increase electricity production by up to 25% [44]. Agrivoltaic systems must be designed to grow appropriate vegetation depending on the available solar energy, soil, ambient climate, and other conditions. Therefore, the optimal conditions in agrivoltaic systems should be specific to the area where the system is implemented.

The PV module energy production mainly depends on the cells' temperature and the solar radiation. These parameters are related to the following factors: azimuth, tilt, latitude, solar declination, the slope, vertical shadow angle, hourly angle, zenith angle, elevation height, presence of vegetation at the bottom of the panels. The performance of a solar panel is determined by the amount of solar radiation it receives, whereas the temperature can create power losses (high temperature) or enhance the power (low temperature). The amount of solar radiation that the PV array receives changes depending on the geographical location, the sun's movement, the climatic conditions of the area, and the orientation of the panels [83]. Ideally, a photovoltaic installation should have the incident solar flux perpendicular to the array surface to maximize the panels' energy potential [84,85]. Thus, the optimal orientation must be determined due to the perpetual movements of the sun.

The orientation of the panels is determined through two parameters i.e., the azimuth and the tilt. The movement of the sun is a function of its elevation which depends on two parameters, namely the latitude and the solar declination. Furthermore, according to Jafarkazemi and Saadabadi [86], the azimuth angle of the surface, latitude, time of day, slope or tilt angle, day of the year, and incident radiation angle determine the amount of solar radiation received by the PV panels installed on a given area (Figure 10).

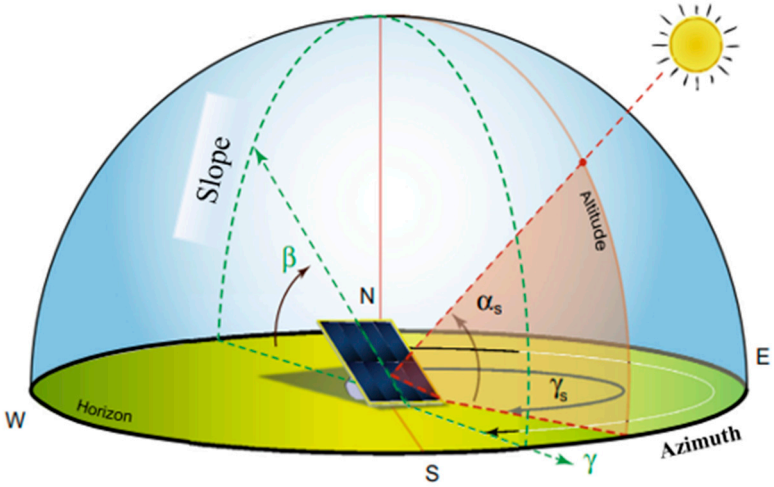

Figure 10. Factors affecting the performance of solar PV panels [87].

In particular, the electrical energy resulting from the transformation of the solar energy absorbed by the panels is strictly related to the slope (the tilt angle) and the azimuth angle [88]. The tilt angle (elevation angle) represents the angle formed by the horizontal

plane of the installation and the PV panels for a fixed structure [85,89]. A change in the tilt angle simultaneously leads to a change in the amount of radiation reaching the surface of the PV panels [89]. However, as a general rule, the tilt angle for a PV array installation is nearly equivalent to the latitude of the area [90,91]. The solar azimuth is the horizontal angle between the vertical plane normal to the surface and the vertical plane in which the center of the solar disc is contained, oriented in the north–south direction [91]. For this purpose, the azimuth values of 90°, 0°, +90°, 180° correspond to the positions east, south, west, and north of the panels, respectively [85,92]. Thus, the panels are oriented to the north in the southern hemisphere and the south in the northern hemisphere [93].

Other parameters that can likely affect the performance of photovoltaic modules are (i) the albedo, which is the amount of radiation reflected from the ground surface across the solar spectrum and (ii) the vertical shadow angle, sometimes referred to as the vertical profile angle, which is the direction in degrees of rotation of the center of the solar disc [91]. To these parameters, Oudrane et al. [94] and Nfaoui and El-Hami [95] added the hourly angle, which is a function of the daily spinning of the earth with respect to its axis, and the declination, which is the angle between the "center of the earth-sun" vector and the equatorial surface of the earth. Yilmaz et al. [96] considered in addition to these parameters the zenith angle which is the angle between the sun's direction and the vertical of the location.

In addition, the elevation height and the occupation of the surface where the PV array is installed can have an impact. These factors have been highlighted by Chemisana and Lamnatou [97], Ogaili and Sailor [98], Alshayeb and Chang [99], and Osma-Pinto and Ordóñez-Plata [100]. They evaluated the electrical energy generated by a photovoltaic array on rooftops using different elevations and different ground level supports. According to Alshayeb and Chang [99], the presence of vegetation at the bottom of the panels can be advantageous, resulting in an increase of 0.25 to 0.4% in the efficiency of the solar panels when the panels are installed at the height of 50 to 75 cm from the roof [100]. According to Chemisana and Lamnatou [97], vegetation below the panels leads to a decrease in ambient temperature that can cause an increase of 1.29–3.33% in the maximum power output of the PV array. Furthermore, Ogaili and Sailor [98] showed that the presence of vegetation could cause an increase in the energy output of 0.8% to 1.2% compared to a white or black colored substrate, respectively, when the panels were elevated at 18 cm from the roof.

5. Impact of Agrivoltaic Systems on Crops

5.1. Importance of Solar Radiation on the Process of Photosynthesis

Sunlight is the key factor in photosynthesis. Photosynthesis consists of the production of oxygen and glucose that crops can use for growth and development [101,102] as a result of the reaction between water and carbon dioxide absorbed through the stomata, which are small holes in the lower epidermis, and controlled by sunlight [103]. Equation (3) is a summary of the photosynthetic reaction.

$$6H_2O + 6CO_2 \overset{Solar\ energy}{\rightarrow} C_6H_{12}O_6 + 6O_2 \quad (3)$$

$$\Delta_rG^{o'} = +2870\ kJ/mol, \Delta_rG^{o} = +2875\ kJ/mol = \Delta_rG^{O''} \quad (4)$$

Photosynthesis can be broken down into two stages. The first step, called the light reaction, consists of the absorption of sunlight by the chlorophyll pigments [104], resulting in the production of electrons and protons, which are responsible for the production of adenosine triphosphate (ATP) and nicotinamide adenine dinucleotide phosphate (NADPH) at the thylakoid membrane [103]. The second step is the dark reaction in which NADPH and ATP generated in the light reaction is used to produce carbohydrate from CO_2 through the Calvin–Benson cycle in the chloroplast stroma [104–106]. Figure 11 gives an overview of the importance of light in the process of photosynthesis.

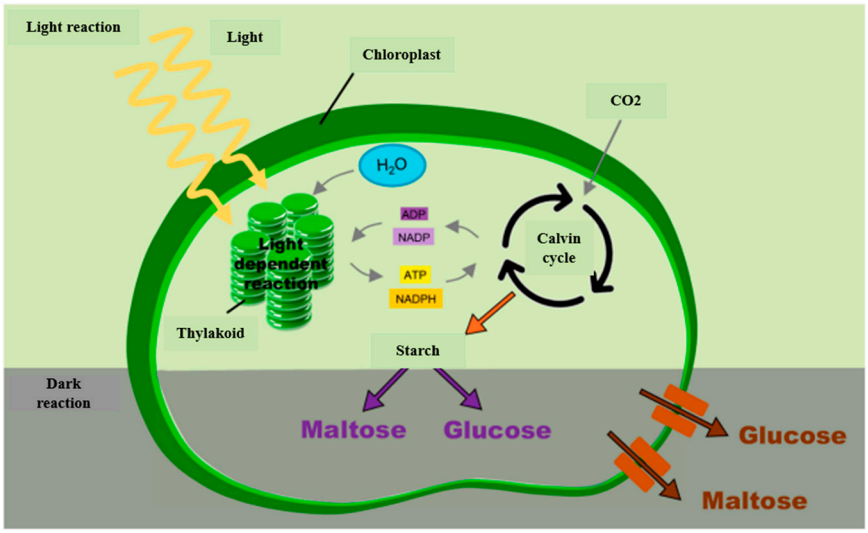

Figure 11. The overall process of photosynthesis at the chloroplast level [107].

Chlorophylls are the primary pigments in crop cells that absorb sunlight in the blue (450 nm) and red (650 nm) wavelengths and give the crop its green color. However, there are other pigments in crop cells, namely carotenoids, which absorb blue light and give the leaves their yellow color. Furthermore, the excitation of ions in the process of photosynthesis is driven by the absorption of specific wavelengths of light in the visible range [103], as shown in Figure 12.

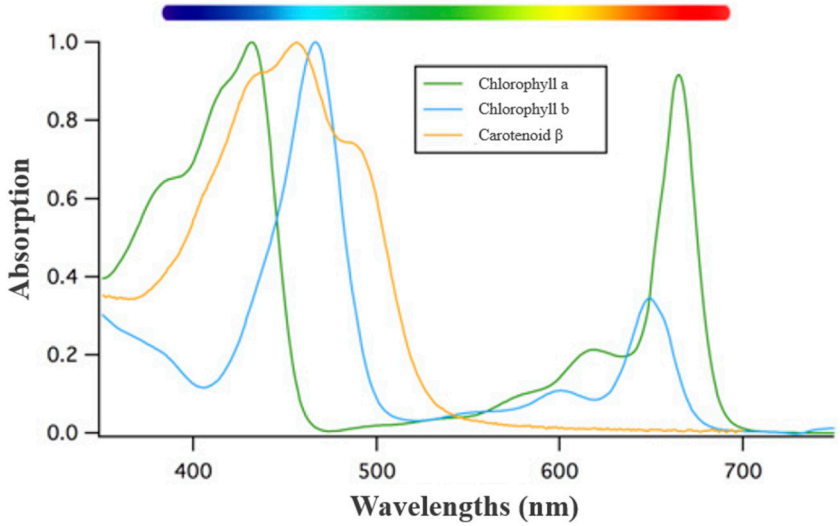

Figure 12. Basic absorption spectra of crops' main chlorophyll and carotenoid pigments [103].

Indeed, wavelengths from 430 to 500 nm are effective in chloroplast development and photosynthetic function [106,108]. In addition to promoting photosynthetic activity, wavelengths from 640 to 670 nm are necessary for leaf growth and crop biomass production [106,109]. Furthermore, according to Wang and Folta [110], the wavelengths 500–600 nm are of great importance in chlorophyll content, photosynthetic function, and consequently crop growth.

This part of the solar radiation of wavelength 400–700 nm is called photosynthetically active radiation and represents the part of solar radiation mainly used for photosynthesis [111,112]. However, the total proportion of solar energy in the photosynthetically active band represents only 48.7% of the average solar spectrum measured at the Earth's surface. At the same time, the chlorophyll pigment is considered as an imperfect radiation absorber

in the 400–700 nm band because it weakly absorbs solar radiation in the green band. Therefore, it is estimated that 90% of the radiation is photosynthetically absorbed by vegetation, and 10% is reflected [113]. According to Amthor [114], the solar radiation intercepted at the Earth's surface depends on the area's location, the presence or absence of clouds in the sky, and the sun's elevation. In addition, the fraction of incident solar radiation intercepted by crops is a function of leaf area and orientation. Furthermore, the total photosynthetically active radiation absorbed by chlorophyll pigments for a crop that has reached whole leaf area development is estimated at 92%.

5.2. Factors That Can Affect Crop Growth in Agrivoltaic Systems

Agrivoltaic systems are systems in which crops are grown, considering factors that may affect crop growth, including the level of shade, climatic factors, and water consumption [115].

Access to the limited amount of sunlight needed for the photosynthetic process is the main challenge for crop productivity under PV panels [24,116], as sunlight is the key factor playing a significant role in crop growth and development [117].

Touil et al. [118] reported that PV panels can cause a reduction of over 40% in the amount of solar radiation received by crops. A coverage rate of 50% or more can also hinder crop growth. For example, a panel-induced shading level of 50% led to a decrease in crop height and stalk diameter, and a decrease in net leaf photosynthesis rate, leaf specific weight, dry matter accumulation on leaves and stalks, and grain number of maize. To this end, the optimal level of shading to ensure energy requirements for photosynthesis consists of a level of photosynthetic photon flux density capable of both saturating CO_2 assimilation and favoring the stabilization of shading conditions and reducing photoinhibition [24].

Nevertheless, the shading induced by the photovoltaic field can be beneficial by reducing the amount of water lost through evaporation and therefore increasing water use efficiency [119]. To this end, these devices are favorable in drought-prone areas during hot periods, as they reduce crop water demands due to reduced evapotranspiration [38,53,54,120]. According to Yue et al. [121], agrivoltaic systems can increase soil moisture by 14.7% for fixed installations and 11.1% for mobile installations. Moreover, based on a study conducted by Adeh et al. [52], panels in agrivoltaic systems allow for more efficient water use (estimated at 328%) by maintaining higher soil moisture levels compared to soil moisture in a full-sun growing area. Barron-Gafford et al. [54] showed that the positive effect of agrivoltaic systems on water conservation is exacerbated by applying water to the crops based on a two-day irrigation frequency that maintains 15% higher soil moisture compared to the soil under full sun. However, although soil moisture remained higher under the panels, it was reduced by 10% based on a daily application of the crop's water requirements. Furthermore, studies conducted in dryland environments on the impact of agrivoltaic systems on specific crops showed that water use efficiency under the panels was estimated at 157%, 65%, and 12% for chili, tomato, and lettuce, respectively, for a 4 m panel elevation [50,118]. Furthermore, a simulation study by Elamri et al. [40] showed a reduction of less than 20% in the water requirement of lettuce as a result of the effect of panel shading.

The shading caused by the panels and the increase in soil moisture affects the microclimate of the area cultivated under the panels. Adeh et al. [52] established that the elevation of the PV panels by 1.2 to 2 m causes a considerable change in air temperature, relative humidity, and wind speed on the surfaces near the PV panels. In a study conducted in the USA on tomato cultivation, it was observed that the air temperature varied between 21.5 °C and 22.3 °C in the subplots cultivated in the open air, whereas it decreased to 19.8 °C under the panels (for an elevation of 2.2 m and a tilt angle of 18°). The rows had the highest average relative humidity at 79.38%, followed by sub-plots cultivated in the open air at 74.63%, and sub-plots located under the panels had an estimated humidity of 73.54%. The soil temperature was estimated to be 20 °C, 24.7 °C, and 25.6 °C under the PV panels, between the panel rows and the control, respectively. In addition, the wind

speed was lower (0.65 m/s) between the rows of panels, whereas it was 0.89 m/s in the open field [119]. According to Noor and Reeza [122], the microclimate under the panels varies differently depending on the area's climate and the land's topography. Their study in the tropics showed that the air temperature was the same in the open field and the higher and middle areas under the panels. However, it was higher in the areas of lower topography under the PV panels. Regarding relative humidity, these studies showed that relative humidity was higher under the PV panels, estimated at 65%, compared to 63.7% between the rows of PV panels and 53.5% in full sun.

The panels reduced the average soil temperature of 5.2 °C in summer with a minimum of 3.5 °C and a maximum of 7.6 °C, and an increase of 1.7 in winter in the UK [21,121]. Abu-Hamdeh [123] showed that the soil temperature under the panels recorded a decrease of 3.1 °C in arid zones and 1.1 in equatorial and temperate zones. Moreso, the soil temperature can vary depending on the installation technology. For example, the ground temperature under fixed panels was found to be lower than under mobile panels since the radiation intercepted by the panels is higher for mobile technologies [51,121]. Weinstock and Appelbaum [124] showed that agrivoltaic systems can lead to a reduction in soil temperature of 4 °C for fixed and 1.5 °C for mobile installations.

5.3. Impact of Solar Panels on Crops

The success of production in agrivoltaic systems is highly dependent on the choice of crops to be grown. Crops grown under PV panels are often subject to different climatic conditions than those grown in full sun because of the shading created by the solar panels. Furthermore, crops of different varieties of the same species may respond differently under the same conditions [29]. For this purpose, the impact of agrivoltaic systems on crops is summarized in Table 2, considering different crops and locations.

Table 2. Impact of photovoltaic panels on different crops in different localities.

Crops	Study Area	Height and/or Spacing or Shading Rate	Impact on Culture	Sources
Durum wheat	Montpelier, France	Height of 4 m Spacing 1.64 m (distance between the lower side of two consecutive panels) Tilt of 25°	• 11–29% reduction in dry matter • 8 to 11% reduction in yield	[24]
Lettuce and cucumber	Montpelier, France	Height of 4 m Tilt of 25°	• Reduction of evapotranspiration by 62% and 70% for lettuce and 73% to 81% for cucumber • Crop cover was significantly higher in the shaded treatments (150% between days 124 and 144)	[50]
Lettuce	Montpelier, France	Height of 4 m Two spacings: 1.6 m in full density and 3.2 m between rows in half density Tilt of 25°	• Crop axis under PV panels was 7.4 cm with 2.0 g dry matter per axis compared to 6.6 cm and 2.5 g per axis in full sun • Significantly reduced number of leaves in the shade • Increased leaf area	[49]
Lettuce	Kansas, USA state	Height of 4 m Two spacings: 6.4 m in half density and 3.2 m between rows in full density	• 42% reduction in yields for the 3.2 m spacing and 19% for the 6.4 m spacing in summer • No impact on yield for the 6.4 m spacing in spring but 21% reduction for the 3.2 m spacing	[38]

Table 2. *Cont.*

Crops	Study Area	Height and/or Spacing or Shading Rate	Impact on Culture	Sources
Chili and tomato	Tucson, USA	Height of 3.3 m above the soil surface at their lowest point Spacing of 1 m Tilt of 32°	• For Capsicum annuum var. glabriusculum, production is three times higher under the panels • For C. annuum var. annuum, there is no impact • For S. lycopersicum var. cerasiforme, production is two times higher under the panels	[54]
Maize	Chiba Prefecture, Japan	Height of 2.7 m Two row spacings: 0.71 m for high-density and 1.67 m for low-density Tilt of 30°	• Yields of 3.54 kg/m^2, 3.35 kg/m^2 and 3.23 kg/m^2 at a distance of 1.67 m in full sun and at a distance of 0.71 m, respectively	[55]
Grape	Ongjin-Gun, Republic of Korea	Height of 2 m Tilt of 15° Shading level of 30 of the total roof area	• Germination period, number of flowers and grape growth are identical in all treatments	[56]
Basil and spinach	Italy	-	• Reduction in marketable biomass yield by 15% and 26% for basil and spinach, respectively	[28]
Sesame, mung bean, kidney bean, corn and soybean	Jeollanam-do, South Korea	Height of 5.42 m Shading rates of 32%, 25.6% and 21.3%	• Yield reductions for all crops except maize at 21.3% shade • At 21.3%, yields increased by 6% for maize and decreased by 7%, 13%, 21% and 26% for sesame, soybean, mung bean and kidney bean, respectively • At 25.6%, yield reduction of 14% for sesame and 35–44% for beans • At 32%, yield reduction of 53% for sesame and 30–44% for other crops	[48]
Oilseed rape, onion, faba bean and forage maize in rotation with potato melon, carrot, onion and dry pea in rotation with tomato	Sevilla, Spain	Height of 5 m Spacing of 9.5 m between suppoted structure Tilt of 27°	• Reduction in crop yields under shade following a correlation of studies already carried out on the effect of shade on the area (reduction of 10%, 7%, 17%, 6%, 20%, 23%, 15% and 5% for carrot, maize, melon, onion, rape, potato, dry pea and tomato, respectively)	[58]
Celery	Southwest Germany	Row distance: 9.5 m (2.8 times module row width)Height (free space in the direction of the work/top edge): 5.5 m/8 m	• Crop height was 30.6% and 14% higher under panels in 2018 and 2017, respectively • Dry matter yield of above-ground biomass was 48% and 31.9% higher under panels • Bulb yield decreased by 18.9% in 2017 and increased by 11.8% in 2018	[59]

Table 2. *Cont.*

Crops	Study Area	Height and/or Spacing or Shading Rate	Impact on Culture	Sources
Red beet, winter wheat, potato and red clover	Southwest Germany	Height of 5 mSpacing of 6.3 mTilt of 20°	• Increase in crop height for all crops • Between 2017 and 2018: −19 to +3% for winter wheat, −20 to +11% for potato and −8 to −5% for red clover and	[125]
Rice, onion, garlic, rye, soybean, bean, maize, forage crop	South Korea	Height of 3.3 mSpacing of 1.5 mShading rate of 30%	• For rice, stem height was 3.8 cm higher under the panels and yields decreased by 18.7% in 2018 and 8.9% in 2019 • For soybeans and beans, yields decreased by 68.7% and 73.3%, respectively • For garlic and onions, yields decreased by 18.7% and 14.6%, respectively • For fodder crops, the height was 7.4 m higher under the panels, nevertheless the yield decreased by 3.1 t/ha	[126]
Rice, potato, sesame, and soybean	South Korea	Height between 4 m and 4.5 m	• No impact on growth except for sesame (lower stem length, number of branches and 1000 seed weight) • Yield reduction of 3% for potato, 19% for sesame, 18–20% for soybean and 13–30% for rice	[42]
Soybean	Monticelli d'Ongina, Italy	Height of 4 to 4.5 mSpacing between rows of trackers of panels of 12 mfour treatments: 27%, 16%, 9% and 18% shading	• Crop height of 98.25 cm at 27%, 90.81 cm at 18%; 86.95 cm at 16% and 85.04 cm at 9% shade under panels and 87.8 cm in full sun • Number of pods reduced by 19.4% at 27% shade and 18.2% at 18% shade compared to treatments with 16% or less shade • Grain yield reduced by 8%, 4.6% and 11.8% for 27%, 9% and 18% shade respectively compared to full sun versus 4.4% increase for 16% shade	[127]

6. Influence of Agrivoltaics Systems on PV Module Performance

Few studies have focused the impact of agrivoltaic systems on the performance of solar panels. This is because crops are most affected by these types of installations. However, Table 3 gives an overview of some of the advantages and disadvantages of these installations on solar panels highlighted by some authors.

Table 3. Impacts of agrivoltaic systems on the performance of solar PV panels.

Advantages/Disadvantages	Description	Source
Advantages on PV panel	Increase energy production due to increased area through the LER	[39,117]
	Decrease in temperature of solar panels could be achieved by using agricultural moisture, evaporation from agricultural activities, and transpiration from crops which results in the increase in electricity generation	[128]
	PV panels in agrivoltaic systems can generate between 3.05% and 3.2% more energy compared to PV installations without cultivated crops	[129]
	Decrease in ambient temperature can cause an increase of 1.29–3.33% in the maximum power output of the PV array	[97]
	The presence of surface green due to vegetation at the bottom of the panels can results in an increase of 0.25 to 0.4% in the efficiency of the solar panels	[99]
Disadvantages on PV panel	Agrivoltaic can reduce the efficiency of electricity generation or agriculture when taken separately	[39]
	Decrease in the electricity produced with the reduction in the density of solar PV panels	[38,48,55]

7. Models Already Developed in the Agrivoltaic Field

One of the first models developed to optimize agrivoltaics was carried out in Montpelier by [24]. This is a model for intercepting the radiation available on the panels (developed on R software) and simulating the crop's development (generic crop model STICS). The light interception model calculates the daily radiation at any point on the ground using a ray-tracing algorithm. The crop simulation model was used to predict the behavior of crops under the panels. For the light simulation, ray tracing algorithm was used to make the simulation. The daily direct and diffuse radiation quantity striking any point of the ground below the array consisted of the output.

The authors of [38] utilized the STICS model, which comprises four primary modules. These modules include the crop growth module, soil interaction module, crop management module, and microclimate module. The crop model determines the effects of climate and soil moisture content on the immediate microclimate surrounding the crops. Indeed, they set up a solar PV system model and a crop model to optimize the performance of the agrivoltaic system. In their PV model, they formulated an optimization problem whose objective was to maximize the incident solar irradiance on the PV, while considering the additional land cost due to minimizing inter-row shading. They proposed to reduce panel density or use semi-transparent panels to reduce the effects of shading. In order to optimize the geometry of an agrivoltaic system, the crop, solar irradiance, mounting height, environmental climate, and tilt angle are crucial. The module production model was developed on PVsyst.

The use of the STICS model is advantageous because it allows the assessment of the impact of the configuration of a given agrivoltaic installation on crop growth. Therefore, real data from field experiments are required to use the model.

Amaducci et al. [120] had developed a software platform on Scilab by coupling the radiation and shading model to the generic crop growth simulator (GECROS). The GECROS crop model predicts crop biomass and yields as a function of climatic factors such as radiation, temperature, wind speed, and partial vapor pressure, as well as the amount of water and nitrogen available in the soil. Regarding the shading radiation model, it consisted of calculating direct and diffuse radiation at ground level with a time step ts = 0.5 h and a spatial resolution of 0.12 m by developing a procedure to calculate whether a portion of soil that is shaded or that receives direct radiation. This study was conducted using a tracking system.

Malu et al. [130] carried out agrivoltaic system modeling to study the electrical performance of agrivoltaic systems when combining grape and energy production in the Nashik

District of Maharashtra State in India using the National Renewable Energy Lab's System Advisory Model (SAM) version 2014.1.14, which uses weather data, location of the study area, PV array size, DC/AC ratio, azimuth angle, required axis type, and tilt angle. Inputs data consist of the weather data, the ratio of DC to AC power, the azimuth angle, the tilt angle, the type of axis required, the size of the system array, and the tilt angle. However, the study focused more on energy production.

Elamri et al. [40] investigated the variations of water in soil and the productivity of crops under PV panels. For this purpose, they used a model called "AVirrig" adapted based on the existing "Optirrig" model. Optirrig was built to generate and optimize irrigation scenarios that operate at a daily time step. The inputs used in this model are rainfall, radiation, air temperature, reference evapotranspiration, soil water reserves, leaf area index, dry matter, and crop yield. "AVirrig", which also includes the "AVrain" model that describes the redistribution of rainfall by solar panels depending on the method of panel installation, consists of a reservoir model that assumes the presence of three water reserves in the soil. This is a specific adaptation of "Optirrig" for AV installations that take into account the fluctuation of the shadow created by the PV modules. In opposition to Malu et al. [130], this study focused more on agricultural production.

Similar to Amaducci et al. [120], Potenza et al. [127], performed modeling to optimize the growth of crops under panels in Italy by coupling the GECROS crop growth model with a set of algorithms to estimate and specialized shading, radiation, and crop-related parameters. The system simulates the entire crop growth cycle, carbohydrate distribution, and grain yield of crops under the panels. Crop height, leaf chlorophyll content, leaf area index, and specific leaf area were measured throughout the experiment. Radiation mapping, calculated on the cells with a resolution of 0.12 m $\times$ 0.12 m and a time step of 30 min, was used to determine the shadow depth. GECROS is advantageous because it allows the prediction of biomass and yield based on the knowledge of climatic parameters. Thus, a knowledge of the variation of climatic parameters under the panels allows to determine the adequate configuration of an agrivoltaic system.

Trommsdorff et al. [43] investigated the electrical efficiency of PV systems applied to crops and the behavior and productivity of crops under panels in Germany's largest agrivoltaic research facility. The study was conducted according to the variation of solar radiation available to the PV panels and the crops. All light simulations for the PV modules were performed with Radiance, which is a back ray tracer for optical calculations in virtual environments that takes into account both direct and diffuse fractions of the irradiance, allowing the simulation of ground reflections to analyze the electrical gains on the back side of the PV panels. In addition, they used ZENIT software tool, which considers, among other things, temperature coefficients, specific efficiency curves, maximum power points, and inverter power limitations to evaluate the overall electrical efficiency. Virtual sensors measured the radiation under the panels. Simulations were performed for different orientations of the APV field between South and South–West (0°, 15°, 30°, 45°) and different distances between rows of panels. Moreso, the photosynthetically active radiation under the panels was converted into biomass yield.

Kim et al. [48] focused on the electricity production of agrivoltaic systems and the increase in revenue when implementing such a system. Thus, they implemented a polynomial regression to develop a model for estimating the system's electricity production using machine learning. The model considered eight (8) parameters, including solar radiation, daily minimum and maximum temperature, daily rainfall, humidity, wind speed, shading ratio, and type of solar panel. However, the shading data used in the study was calculated as panel area over the system area. Therefore, the model does not provide an indication of the optimal configuration in terms of spacing, elevation, and inclination for the crop to be grown.

Pulido-Mancebo et al. [131] have developed a model for optimizing agricultural production under the panels to convert photovoltaic power crops into agrivoltaic systems. It consists of a mathematical model that simulates the solar incidence in a network of

representative points on the ground, depending on the geometry and design of the PV crop to be converted to agrivoltaics. The study focused on photovoltaic installations with rectangular collector planes inclined towards the south and one side of the rectangle (wider) oriented in an east–west direction and parallel to the ground and with the shorter side oriented in a north–south direction. The model is based on the representation of the sun's position with respect to the geometry of the collector array (latitude of the location, solar declination, day angle, and solar time) as well as the geometry of the PV system itself (a rectangle represents the system). The model geometrically determines the shading at any point on the ground by determining the direct and diffuse radiation on the horizontal ground without obstacles. The inputs were the declination, the latitude, solar time, and daily angle. This model is advantageous because it allows a quick overview of the radiation in the ground in agrivoltaic systems.

Nevertheless, these models do not directly give a specific elevation, spacing, and inclination for a given crop and given locality. These models are used to determine whether or not a selected configuration is suitable for a given crop and need to be optimize. All these modeling studies have been set up to study and verify the performance of a specific installation to see the impact of this installation on the yield of the crop being grown in this system. Moreover, Pulido-Mancebo et al. [131] have developed that simulates the solar incidence in a network of representative points on the ground; nevertheless, it does not directly give the optimal spacing between rows of panels and between panels and the elevation to choose for a given crop.

Therefore, considering the limited number of decision support studies that have been conducted to determine the ideal configuration, i.e., elevation, panel row spacing, and panel spacing and tilt for any given crop, this review article has been developed to clearly explain agrivoltaics. We believe that this review can be used as a guide to set up a model that will take into account geometric, geographical, climatic, crop, and PV panel factors which will have as outputs the optimal spacing between panels, elevation, and tilt that will result in maximizing the crop yield and power of the PV system in agrivoltaic systems.

8. Conclusions

The agrivoltaic system was first used in 1980. However, only a few studies were carried out in this field during this period. It is only since 2011 that many have started to work in this field. To this end, several studies have emerged in this field in recent years. These studies have mainly focused on implementing a given configuration of photovoltaic solar panels to reduce the effects of shading on crops. Several panel elevations and spacings were tested on several crops in different areas. However, these proposed arrangements were specific to the site and crop being tested. Thus, no study has been carried out to establish a model that allows for optimal panel elevation and spacing for a given area and crop. It is within this framework that this review was carried out. It gives a clear explanation of the agrivoltaic systems in full sunlight, the principle of operation of the panels, and the photosystem, both of which depend on solar radiation, as well as the factors that can affect their operation. It also shows the key factors that should be considered in an optimization model. This review examined the strengths and weaknesses of each type of installation to better select the system to be used and to optimize both the yield of the crops to be planted under the panels and the yield of the solar panels installed. For this purpose, the choice of an optimal elevation height, spacing, and tilt of the solar panels will reduce the impact of shading and increase crop yields, but also increase the power output of the solar photovoltaic panels, which is a twofold benefit. According to us, setting up a model that can be used for any area to find an optimal panel arrangement in the locality being studied would be an innovative solution that will be of high interest, especially in areas where the agrivoltaic system has never been tested. Furthermore, in the future, other studies may be conducted in the field of agrivoltaics, namely the evaluation of the environmental impact of the use of the panel structure which is becoming more imposing in elevated systems. Moreover, further research could also explore the economic implications of using

agrivoltaics for pumping water to support crop production and generating electricity for sale by small-scale farmers in rural areas where electricity access is limited.

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Nomenclature

β	Slope
γ	Azimuth
α_s	Coordinates of solar altitude
γ_s	Solar azimuth
AC	Alternating current
A_i	Uncultivated agricultural area
A_n	Cultivated agricultural area
ATP	Adenosine triphosphate
CdTe	Cadmium telluride
DC	Direct current
DSSCs	Dye-sensitized solar cells
E	East
GECROS	Genotype-by-Environment interaction on CROp growth Simulator
h_1	Installation height greater than 2.1 m
h_2	Installation height less than 2.1 m
LER	Land Equivalence Ratio
N	North
NADPH	Nicotinamide adenine dinucleotide phosphate
PV	Photovoltaic
S	South
SAM	System Advisory Model
STICS	Simulateur mulTIdisciplinaire pour les Cultures Standard, or multidisciplinary simulator for standard crops
W	West
x	cultivated crop
y	electricity

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Register of Deeds January 2024

Program/Service Description	Output Measures 2022	2023	2024	YR to Date Totals	Current Yr. Target %
Documents Recorded	1,247	704	745	745	6%
Vital Records Filed	155	160	182	182	8%
Vital Record Copies	1,486	1,338	1,721	1,721	11%
ROD Revenue (Gross Total)	$ 161,697.97	$ 132,299.51	$ 125,783.58	$ 125,783.58	7%
Transfer Fees	$ 20,723.82	$ 18,847.50	$ 16,463.22	$ 16,463.22	8%
LIO Fees	$ 10,677.00	$ 6,174.00	$ 6,652.00	$ 6,652.00	6%
Document Copies	$ 7,481.02	$ 5,085.51	$ 5,335.98	$ 5,335.98	10%
Laredo	$ 3,594.85	$ 2,887.50	$ 5,168.50	$ 5,168.50	16%
ROD Revenue to General Fund	$ 55,767.69	$ 42,204.31	$ 44,306.70	$ 44,306.70	8%
Percentage of Documents eRecorded	66%	59%	66%	68%	
Budget Goals Met	Yes	Yes	Yes	Yes	Yes
Back Indexed	931	12,862	745	85,484	10%

Wisconsin Register of Deeds Association:

The legislation to decrease the transfer fee is moving forward, please see 2023 SB274 for more details. SB274 has been moved from the committee to go to the floor for a vote,this will go into effect yet this year. AB966, judicial privacy shielding has been passed in the house, this will affect all county departments requiring the removal of personal information from the public. PRIA Loca, which I co-chair, will be working with stakeholders on how to implement this at the county level.

Register of Deeds Office:

The staff continues to work on back indexing documents for easier access. Giving our searchers and staff the ability to search documents by name and legal description back to 1947.

Wisconsin Counties Association Board of Directors:

Nothing new to report

Wisconsin Public Records Board:

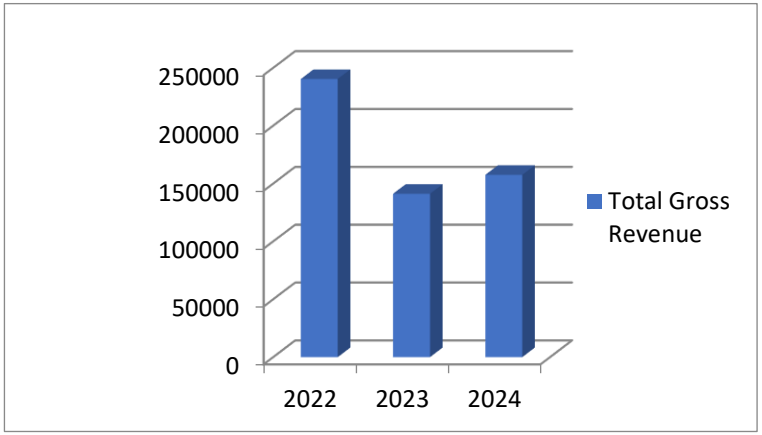
Nothing new to report

Register of Deeds Year to Date Budget Report

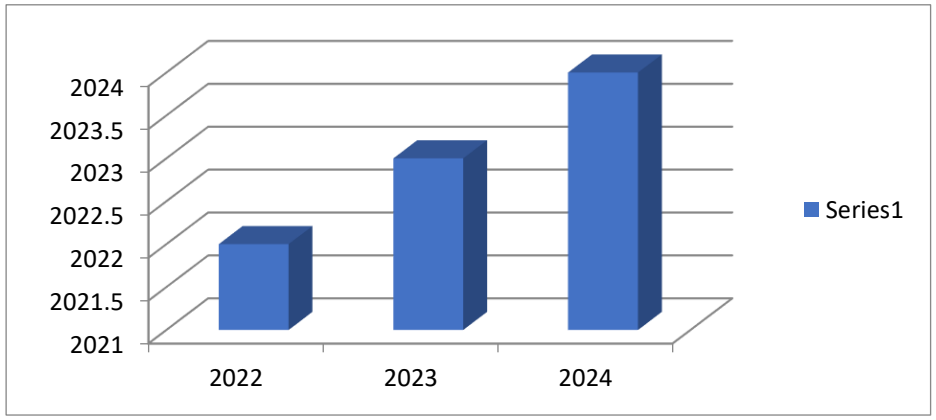
January

2024

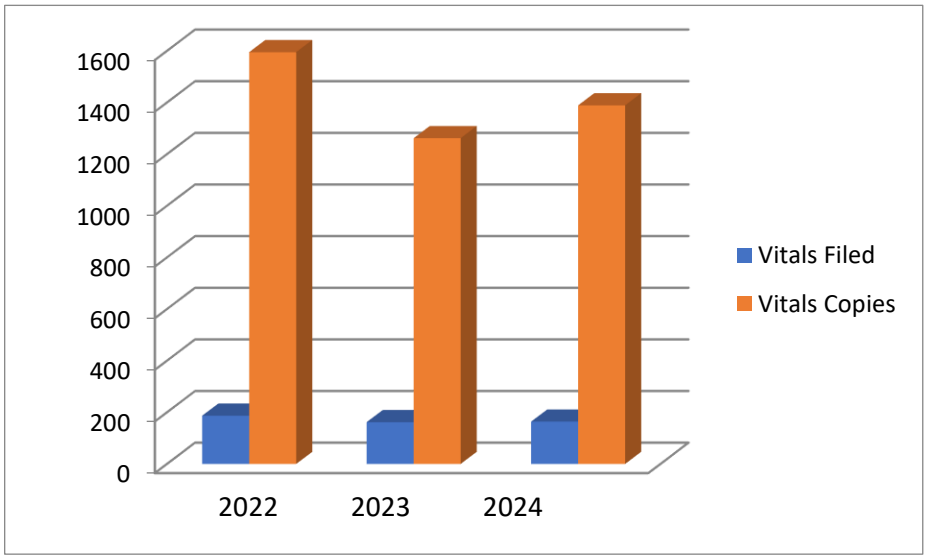
ROD Total Gross Revenues



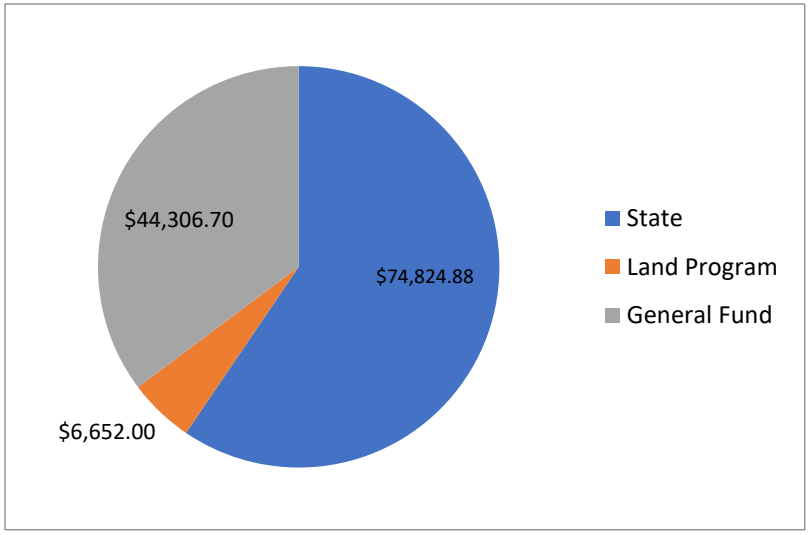
Land Related Revenue



Vital Records



Year to Date Revenue Payout



Zoning 2023

FROM 2023 01 TO 2023 12

ACCOUNTS FOR: 100 General Fund	ORIGINAL APPROP	TRANFRS/ ADJSTMTS	REVISED BUDGET	ACTUALS	ENCUMBRANCES	AVAILABLE BUDGET	PCT USED
12901 Zoning							
12901 411100 General Property Taxes	-395,657	0	-395,657	-395,657.40	.00	.05	100.0%
12901 432002 Private Sewage System	-60,000	0	-60,000	-55,655.00	.00	-4,345.00	92.8%
12901 432099 Other Permits	-145,000	0	-145,000	-161,940.00	.00	16,940.00	111.7%
12901 441002 Co Ordinance Forfeiture	0	0	0	-566.00	.00	566.00	.0%
12901 451002 Private Party Photocopy	-1,000	0	-1,000	-1,315.31	.00	315.31	131.5%
12901 458010 Soil Testing Fee	-7,500	0	-7,500	-10,820.00	.00	3,320.00	144.3%
12901 472003 Municipality Copies & Printin	0	0	0	-6.25	.00	6.25	.0%
12901 511110 Salary-Permanent Regular	109,963	0	109,963	112,158.88	.00	-2,196.00	102.0%
12901 511210 Wages-Regular	279,961	0	279,961	281,382.40	.00	-1,421.59	100.5%
12901 511220 Wages-Overtime	1,661	0	1,661	710.64	.00	950.04	42.8%
12901 511240 Wages-Temporary	8,986	0	8,986	10,143.75	.00	-1,158.15	112.9%
12901 511330 Wages-Longevity Pay	750	0	750	1,113.75	.00	-363.75	148.5%
12901 512141 Social Security	28,477	0	28,477	29,487.79	.00	-1,011.16	103.6%
12901 512142 Retirement (Employer)	26,679	0	26,679	26,370.77	.00	307.97	98.8%
12901 512144 Health Insurance	94,213	0	94,213	67,589.39	.00	26,623.68	71.7%
12901 512145 Life Insurance	141	0	141	152.77	.00	-11.83	108.4%
12901 512173 Dental Insurance	4,602	0	4,602	3,881.62	.00	720.38	84.3%
12901 521212 Legal	0	0	0	1,079.68	.00	-1,079.68	.0%
12901 521212 12901 Legal	0	0	0	1,889.55	.00	-1,889.55	.0%
12901 531301 Office Equipment	0	0	0	6.99	.00	-6.99	.0%
12901 531311 Postage & Box Rent	5,800	0	5,800	6,410.46	.00	-610.46	110.5%
12901 531312 Office Supplies	1,500	0	1,500	1,735.54	.00	-235.54	115.7%
12901 531313 Printing & Duplicating	750	0	750	128.15	.00	621.85	17.1%
12901 531321 Publication Of Legal Notice	6,000	0	6,000	6,657.13	.00	-657.13	111.0%
12901 531324 Membership Dues	250	0	250	521.19	.00	-271.19	208.5%
12901 531326 Advertising	0	0	0	372.81	.00	-372.81	.0%
12901 531329 Other Publ/Subscriptions/Dues	100	0	100	98.18	.00	1.82	98.2%
12901 531351 Gas/Diesel	1,600	0	1,600	2,231.08	.00	-631.08	139.4%
12901 532325 Registration	750	0	750	1,827.00	.00	-1,077.00	243.6%
12901 532335 Meals	200	0	200	145.18	.00	54.82	72.6%
12901 532336 Lodging	984	0	984	556.00	.00	428.00	56.5%
12901 533225 Telephone & Fax	1,000	0	1,000	1,124.11	.00	-124.11	112.4%
12901 533236 Wireless Internet	0	0	0	69.09	.00	-69.09	.0%
12901 535242 Maintain Machinery & Equip	1,200	0	1,200	2,327.93	.00	-1,127.93	194.0%
12901 535352 Vehicle Parts & Repairs	0	0	0	50.00	.00	-50.00	.0%
12901 571004 IP Telephony Allocation	955	0	955	1,141.55	.00	-186.55	119.5%
12901 571005 Duplicating Allocation	1,840	0	1,840	134.27	.00	1,705.73	7.3%
12901 571009 MIS PC Group Allocation	18,021	0	18,021	15,793.13	.00	2,227.87	87.6%

FROM 2023 01 TO 2023 12

ACCOUNTS FOR: 100 General Fund	ORIGINAL APPROP	TRANFRS/ ADJSTMTS	REVISED BUDGET	ACTUALS	ENCUMBRANCES	AVAILABLE BUDGET	PCT USED
12901 571010 MIS Systems Grp Alloc(ISIS)	4,148	0	4,148	4,420.02	.00	-272.02	106.6%
12901 571020 Fleet Allocation	3,580	0	3,580	2,791.44	.00	788.56	78.0%
12901 591519 Other Insurance	5,048	0	5,048	4,588.39	.00	459.61	90.9%
12901 591520 Liability Claims	0	0	0	1,320.00	.00	-1,320.00	.0%
TOTAL Zoning	0	0	0	-35,549.33	.00	35,549.33	.0%
TOTAL General Fund	0	0	0	-35,549.33	.00	35,549.33	.0%
TOTAL REVENUES	-609,157	0	-609,157	-625,959.96	.00	16,802.61	
TOTAL EXPENSES	609,157	0	609,157	590,410.63	.00	18,746.72	

LIC 2023

FROM 2023 01 TO 2023 12

ACCOUNTS FOR: 100 General Fund	ORIGINAL APPROP	TRANFRS/ ADJSTMTS	REVISED BUDGET	ACTUALS	ENCUMBRANCES	AVAILABLE BUDGET	PCT USED
12501 Real Estate Description							
12501 411100 General Property Taxes	-335,338	0	-335,338	-335,338.20	.00	.05	100.0%
12501 451006 Real Estate Descrip Charges	-4,500	0	-4,500	-5,063.40	.00	563.40	112.5%
12501 451008 Remote Access Fees	-7,000	0	-7,000	-7,600.00	.00	600.00	108.6%
12501 472011 Other Govt Land Info Charges	-1,800	0	-1,800	-1,319.48	.00	-480.52	73.3%
12501 511210 Wages-Regular	227,978	0	227,978	220,064.14	.00	7,914.10	96.5%
12501 511220 Wages-Overtime	11	0	11	204.94	.00	-193.68	%
12501 511240 Wages-Temporary	0	3,100	3,100	11,666.25	.00	-8,566.25	376.3%
12501 511330 Wages-Longevity Pay	1,046	0	1,046	1,244.98	.00	-199.18	119.0%
12501 512141 Social Security	15,274	0	15,274	16,081.12	.00	-806.99	105.3%
12501 512142 Retirement (Employer)	15,574	0	15,574	14,591.65	.00	982.76	93.7%
12501 512144 Health Insurance	65,071	0	65,071	64,280.73	.00	789.82	98.8%
12501 512145 Life Insurance	47	0	47	64.09	.00	-16.93	135.9%
12501 512153 HRA Contribution	0	0	0	4,605.39	.00	-4,605.39	.0%
12501 512173 Dental Insurance	3,166	0	3,166	2,485.48	.00	680.12	78.5%
12501 531311 Postage & Box Rent	100	0	100	30.71	.00	69.29	30.7%
12501 531312 Office Supplies	400	0	400	369.42	.00	30.58	92.4%
12501 531313 Printing & Duplicating	100	0	100	.00	.00	100.00	.0%
12501 531324 Membership Dues	80	0	80	80.00	.00	.00	100.0%
12501 531326 Advertising	0	0	0	161.26	.00	-161.26	.0%
12501 532325 Registration	140	0	140	345.00	.00	-205.00	246.4%
12501 532332 Mileage	0	0	0	52.40	.00	-52.40	.0%
12501 532335 Meals	100	0	100	73.35	.00	26.65	73.4%
12501 532336 Lodging	492	0	492	338.95	.00	153.05	68.9%
12501 533225 Telephone & Fax	0	0	0	.40	.00	-.40	.0%
12501 535242 Maintain Machinery & Equip	2,100	0	2,100	4,438.83	.00	-2,338.83	211.4%
12501 571004 IP Telephony Allocation	318	0	318	380.52	.00	-62.52	119.7%
12501 571005 Duplicating Allocation	316	0	316	.00	.00	316.00	.0%
12501 571009 MIS PC Group Allocation	12,014	0	12,014	10,528.75	.00	1,485.25	87.6%
12501 571010 MIS Systems Grp Alloc(ISIS)	1,810	0	1,810	1,928.74	.00	-118.74	106.6%
12501 591519 Other Insurance	2,501	0	2,501	2,341.11	.00	159.89	93.6%
TOTAL Real Estate Description	0	3,100	3,100	7,037.13	.00	-3,937.13	227.0%
TOTAL General Fund	0	3,100	3,100	7,037.13	.00	-3,937.13	227.0%
TOTAL REVENUES	-348,638	0	-348,638	-349,321.08	.00	682.93	
TOTAL EXPENSES	348,638	3,100	351,738	356,358.21	.00	-4,620.06	

Zoning 2024

FROM 2024 01 TO 2024 12

ACCOUNTS FOR: 100 General Fund		ORIGINAL APPROP	TRANFRS/ ADJSTMTS	REVISED BUDGET	ACTUALS	ENCUMBRANCES	AVAILABLE BUDGET	PCT USED
12901 Zoning								
12901 411100	General Property Taxes	-401,858	0	-401,858	.00	.00	-401,857.92	.0%
12901 432002	Private Sewage System	-60,000	0	-60,000	-6,500.00	.00	-53,500.00	10.8%
12901 432099	Other Permits	-145,000	0	-145,000	-17,583.00	.00	-127,417.00	12.1%
12901 451002	Private Party Photocopy	-1,000	0	-1,000	-711.00	.00	-289.00	71.1%
12901 458010	Soil Testing Fee	-8,500	0	-8,500	-1,200.00	.00	-7,300.00	14.1%
12901 511110	Salary-Permanent Regular	121,144	0	121,144	13,605.99	.00	107,538.02	11.2%
12901 511210	Wages-Regular	293,945	0	293,945	37,126.42	.00	256,818.70	12.6%
12901 511220	Wages-Overtime	214	0	214	.00	.00	214.16	.0%
12901 511330	Wages-Longevity Pay	750	0	750	.00	.00	750.00	.0%
12901 512141	Social Security	30,433	0	30,433	3,655.94	.00	26,777.09	12.0%
12901 512142	Retirement (Employer)	28,664	0	28,664	3,399.51	.00	25,264.25	11.9%
12901 512144	Health Insurance	69,654	0	69,654	3,171.76	.00	66,482.34	4.6%
12901 512145	Life Insurance	146	0	146	9.26	.00	136.42	6.4%
12901 512151	HSA Contribution	4,070	0	4,070	.00	.00	4,070.10	.0%
12901 512173	Dental Insurance	4,550	0	4,550	875.58	.00	3,674.82	19.2%
12901 531003	Notary Public Related	100	0	100	.00	.00	100.00	.0%
12901 531311	Postage & Box Rent	5,800	0	5,800	.00	.00	5,800.00	.0%
12901 531312	Office Supplies	1,500	0	1,500	.00	.00	1,500.00	.0%
12901 531313	Printing & Duplicating	700	0	700	.00	.00	700.00	.0%
12901 531314	Small Items Of Equipment	4,000	0	4,000	.00	.00	4,000.00	.0%
12901 531321	Publication Of Legal Notice	6,000	0	6,000	.00	.00	6,000.00	.0%
12901 531324	Membership Dues	500	0	500	100.00	.00	400.00	20.0%
12901 531326	Advertising	350	0	350	.00	.00	350.00	.0%
12901 531327	Certification Fees	350	0	350	.00	.00	350.00	.0%
12901 531329	Other Publ/Subscriptions/Dues	100	0	100	.00	.00	100.00	.0%
12901 531351	Gas/Diesel	1,900	0	1,900	.00	.00	1,900.00	.0%
12901 532325	Registration	700	0	700	.00	.00	700.00	.0%
12901 532335	Meals	200	0	200	.00	.00	200.00	.0%
12901 532336	Lodging	810	0	810	.00	.00	810.00	.0%
12901 533225	Telephone & Fax	1,000	0	1,000	.00	.00	1,000.00	.0%
12901 533236	Wireless Internet	200	0	200	.00	.00	200.00	.0%
12901 535242	Maintain Machinery & Equip	1,500	0	1,500	.00	.00	1,500.00	.0%
12901 571004	IP Telephony Allocation	964	0	964	.00	.00	964.00	.0%
12901 571005	Duplicating Allocation	301	0	301	.00	.00	301.00	.0%
12901 571009	MIS PC Group Allocation	22,185	0	22,185	.00	.00	22,185.00	.0%
12901 571010	MIS Systems Grp Alloc(ISIS)	5,087	0	5,087	.00	.00	5,087.00	.0%
12901 571020	Fleet Allocation	3,500	0	3,500	.00	.00	3,500.00	.0%
12901 591519	Other Insurance	5,041	0	5,041	.00	.00	5,040.56	.0%
TOTAL Zoning		0	0	0	35,950.46	.00	-35,950.46	.0%

LJO 2024

FROM 2024 01 TO 2024 12

ACCOUNTS FOR: 100 General Fund	ORIGINAL APPROP	TRANFRS/ ADJSTMTS	REVISED BUDGET	ACTUALS	ENCUMBRANCES	AVAILABLE BUDGET	PCT USED
12501 Real Estate Description							
12501 411100 General Property Taxes	-407,709	0	-407,709	.00	.00	-407,708.81	.0%
12501 451006 Real Estate Descrip Charges	-4,500	0	-4,500	-687.79	.00	-3,812.21	15.3%
12501 451008 Remote Access Fees	-7,000	0	-7,000	-1,000.00	.00	-6,000.00	14.3%
12501 472007 Municipal Other Charges	-40,000	0	-40,000	.00	.00	-40,000.00	.0%
12501 472011 Other Govt Land Info Charges	-1,800	0	-1,800	-2.00	.00	-1,798.00	.1%
12501 511210 Wages-Regular	297,919	0	297,919	23,840.15	.00	274,078.47	8.0%
12501 511220 Wages-Overtime	108	0	108	24.87	.00	83.02	23.1%
12501 511330 Wages-Longevity Pay	1,179	0	1,179	.00	.00	1,179.00	.0%
12501 512141 Social Security	21,002	0	21,002	1,623.76	.00	19,378.03	7.7%
12501 512142 Retirement (Employer)	21,244	0	21,244	1,626.45	.00	19,617.14	7.7%
12501 512144 Health Insurance	88,979	0	88,979	6,750.99	.00	82,228.32	7.6%
12501 512145 Life Insurance	59	0	59	5.83	.00	53.33	9.9%
12501 512151 HSA Contribution	3,779	0	3,779	.00	.00	3,779.38	.0%
12501 512173 Dental Insurance	4,270	0	4,270	446.03	.00	3,823.57	10.4%
12501 531311 Postage & Box Rent	100	0	100	.00	.00	100.00	.0%
12501 531312 Office Supplies	400	0	400	.00	.00	400.00	.0%
12501 531313 Printing & Duplicating	100	0	100	.00	.00	100.00	.0%
12501 531324 Membership Dues	80	0	80	80.00	.00	.00	100.0%
12501 532325 Registration	140	0	140	.00	.00	140.00	.0%
12501 532332 Mileage	75	0	75	.00	.00	75.00	.0%
12501 532335 Meals	100	0	100	.00	.00	100.00	.0%
12501 532336 Lodging	480	0	480	.00	.00	480.00	.0%
12501 533225 Telephone & Fax	100	0	100	.00	.00	100.00	.0%
12501 535242 Maintain Machinery & Equip	2,200	0	2,200	.00	.00	2,200.00	.0%
12501 571004 IP Telephony Allocation	361	0	361	.00	.00	361.00	.0%
12501 571005 Duplicating Allocation	221	0	221	.00	.00	221.00	.0%
12501 571009 MIS PC Group Allocation	13,311	0	13,311	.00	.00	13,311.00	.0%
12501 571010 MIS Systems Grp Alloc(ISIS)	2,220	0	2,220	.00	.00	2,220.00	.0%
12501 591519 Other Insurance	2,582	0	2,582	.00	.00	2,582.47	.0%
TOTAL Real Estate Description	0	0	0	32,708.29	.00	-32,708.29	.0%
TOTAL General Fund	0	0	0	32,708.29	.00	-32,708.29	.0%
TOTAL REVENUES	-461,009	0	-461,009	-1,689.79	.00	-459,319.02	
TOTAL EXPENSES	461,009	0	461,009	34,398.08	.00	426,610.73	

IV. Introduction.

On October 18, 2021, WPL acquired Crawfish River Solar from Crawfish River Solar Holdings, LLC and Crawfish River Solar became WPL's direct, wholly owned subsidiary.

V. Required Information

a. Construction Commencement Date:

Construction commenced on the Crawfish River project on March 7, 2022.

b. Major Construction and Environmental Milestones, including permits obtained, by agency, subject, and date:

Table V.b.1. below identifies the major construction milestones and anticipated planned start dates.

Table V.b.1: Major Construction Milestones for Crawfish River

Construction Milestones	Plan Start	Actual	% Complete
Construction Begins	3/7/2022	3/7/2022	100%
Mobilization	3/7/2022	3/7/2022	100%
Site Preparation and Road Construction	3/7/2022	4/1/2022	100%
Drive Posts	5/4/2022	5/16/2022	100%
Install Racking	5/20/2022	6/13/2022	100%
Install Inverters	8/1/2022	9/22/2022	100%
Install Modules	6/3/2022	7/15/2022	100%
Construction of Project Substation	3/30/2022	4/19/2022	100%
Construct Gen-Tie	7/20/2022	8/12/2022	100%
Start of Commissioning	4/28/2023	4/28/2023	100%
In-Service	12/2023	12/29/23	100%

Table II.b.2 below identifies the environmental milestones, including permits obtained, the applicable governmental agency, and the date obtained.

Table II.b.2: Environmental Milestones for Crawfish River

Name or Description of Project Permit	Applicable Governmental Authority	Date Approved
General permit (GP3)	WDNR	2/15/2022
WPDES/Stormwater runoff permit	WDNR	2/24/2022
Stormwater Permit	County of Jefferson	3/16/2022
Chapter 30 Culvert permit	WDNR	2/15/2022

c. Summaries of the status of construction, the anticipated in-service date, and the overall percent of physical completion:

a. Anticipated in-service date:
   i. The Crawfish River Project was placed in-service on December 29, 2023.

b. Overall percent of completion as of December 31, 2023:
   i. The Crawfish River project is overall 100% complete.
   ii. Overall percentage of physical completion (construction percent complete) is 100%.

d. The date that the facilities are placed in service:

The Crawfish River Project was placed in-service on December 29, 2023.

VI. Compliance Activities

Table IV identifies additional compliance activities that WPL undertook during the quarter.

Table IV: Compliance Activities for Crawfish River

Compliance Activity	Order Point or Requirement	Date

PSC REF#:490154

RANGER POWER

Public Service Commission of Wisconsin
RECEIVED: 1/31/2024 10:44:53 AM

January 31, 2024

Mr. Cru Stubley
Secretary to the Commission
Public Service Commission of Wisconsin
4822 Madison Yards Way
Madison, WI 53705-9100

Docket No. 9800-CE-100: Report for 4th Quarter 2023 on the Certificate of Public Convenience and Necessity of Badger State Solar, LLC to Construct a Solar Electric Generation Facility, to be Located in Jefferson County, Wisconsin

Dear Mr. Stubley,

Pursuant to Order Point 6, we are submitting this quarterly report for the 4th quarter of 2023.

a. Construction Commencement Date;
   - Construction has not yet commenced. A request for extension was filed on May 1, 2023, and granted on June 2, 2023. The current deadline for the start of construction is March 1, 2024, but Badger State Solar, LLC anticipates filing an extension request imminently.

b. Major Construction and Environmental Milestones;
   - Badger State refreshed the Endangered Resources Review with the Wisconsin Department of Natural Resources and is awaiting confirmation of the renewed report for the year of 2024.

c. Construction Updates, In-Service Date and Percent Completion;
   - No construction activity has commenced as of the end of the reporting period.
   - Subject to Badger State's negotiations with its offtake partner, the anticipated in-service date for the 149 MW Badger State Solar is August 1, 2025, but this is likely to change as the construction start date changes.

d. Placed in Service Date;
   - No facilities have been placed in service as of the end of the reporting period.

Respectfully submitted,

Paul Harris
Badger State Solar, LLC
paul@rangerpower.com
(847) 707-1395
320 N. Sangamon St., Suite 1025
Chicago, IL 60607

PSC REF#:490155

RANGER POWER

Public Service Commission of Wisconsin
RECEIVED: 1/31/2024 10:44:53 AM

January 31, 2024

Cru Stubley
Secretary to the Commission
Public Service Commission of Wisconsin
4822 Madison Yards Way
P.O. Box 7854
Madison, WI 53707-7854

RE: Docket No. 9800-CE-100 **Request for Extension to Commence Construction** Application for Badger State Solar, LLC to Construct a New Solar Electric Generation Facility in Jefferson County, Wisconsin

Dear Mr. Stubley:

Badger State Solar, LLC ("Badger State"), respectfully submits this request for an extension of time to begin on-site construction of the 149-megawatt Badger State Solar photovoltaic project (the "Project") to September 30, 2024. Badger State makes this request pursuant to Order Condition 8.a. of the Final Decision in the above-named docket ("the Order").

On February 26, 2020, the Public Service Commission of Wisconsin (the "Commission") granted Badger State a Certificate of Public Convenience and Necessity to construct the Project.

Badger State requested an extension of time to begin construction to June 30, 2023, to secure financing from the United States Department of Agriculture Rural Utilities Service ("RUS"). On January 14, 2021, the Commission approved this request. Before RUS could approve the financing, a third-party environmental impact study ("EIS"), that met the requirements of the National Environmental Policy Act had to be completed, which proved to be a two-year process. The Record of Decision for the final EIS from RUS was issued in December of 2022.

Badger State requested and the Commission granted a second extension of time to begin construction, extending the construction start date to March 1, 2024. That extension was necessary to address supply chain delays resulting from the U.S. Department of Commerce's investigation into antidumping and countervailing duty orders on crystalline silicon photovoltaic cells from China, and to ensure compliance with the United States' Uyghur Forced Labor Prevention Act ("UFLPA").

Badger State requests an extension of time to begin construction to September 30, 2024 in order to address changing project economics. Since receiving approval to construct the Project in early 2020, numerous unforeseen obstacles have arisen that affected the construction

timeline, as briefly summarized above. Since approval was first granted, both construction costs and interest rates have increased significantly, requiring Badger State to reanalyze the Project's economics. Badger State and its planned offtake partner have been and continue working collaboratively to find the best, mutually agreeable path forward, and the parties are hopeful that an updated agreement will be finalized soon. However, additional time is needed to ensure the Project can advance successfully.

For these reasons, Badger State requests that the Commission grant an extension of time to begin construction of the Project to September 30, 2024. This will allow sufficient time for Badger State to continue working with its off take partner to ensure project viability.

Very truly yours,

Paul Harris
Vice President

PSC REF#:490202

We Energies
231 W. Michigan St.
Milwaukee, WI 53203
www.we-energies.com

Public Service Commission of Wisconsin
RECEIVED: 1/31/2024 12:46:44 PM

January 31, 2024

Mr. Cru Stubley
Secretary to the Commission
Public Service Commission of Wisconsin
4822 Madison Yards Way
Madison, WI 53707-7854

Dear Mr. Stubley:

Application of Wisconsin Electric Power Company and Wisconsin Gas LLC for a Certificate of Authority under Wis. Stat. § 196.49 and Wis. Admin. Code § PSC 133.03 to Construct a System of New Liquefied Natural Gas Facilities and Associated Natural Gas Pipelines near Ixonia and Bluff Creek, Wisconsin– Docket No. 5-CG-106

On December 21, 2021, the Commission issued an Order in the above referenced docket. In accordance with Condition 30 of the Order, the Company is submitting the quarterly report for the fourth quarter of 2023.

If you have any questions regarding this project, please contact me at (414) 221-3685 or richard.stasik@wecenergygroup.com.

Sincerely,

Richard F. Stasik
Director – State Regulatory Affairs

Attachment

We Energies
Bluff Creek & Ixonia Liquefied Natural Gas (LNG) Facilities
Docket 5-CG-106
Q4 2023 Progress Report

1. Major Construction Milestones

	Bluff Creek		Ixonia	
Milestone	**Forecast**	**Actual**	**Forecast**	**Actual**
Start of Construction		1/05/2022		1/13/2022
Tank Foundation Mobilization		1/21/2022		3/14/2022
Start Outer LNG Tank	5/16/2022	4/15/2022	6/23/2022	6/14/2022
BOP Buildings Erected	12/16/2022	1/04/2023	12/16/2022	1/06/2023
LNG Outer Tank Roof Complete	1/30/2023	12/14/2022	3/10/2023	3/07/2023
Start Inner LNG Tank	2/07/2023	12/02/2022	3/13/2023	1/24/2023
Delivery of Equipment	8/08/2023	8/14/2023	8/28/2023	9/11/2023
Tank Mechanical Completion Date	8/18/2023	10/5/2023	11/01/2023	10/26/2023
Commercial Operation	11/30/2023	11/30/2023	2/16/2024	
Tank Full*	4/11/2024		6/29/2024	

* This represents the shortest time required to fill the LNG tank, economic conditions may dictate a different schedule for this activity.

2. Summary Status of Construction – Bluff Creek & Ixonia

The overall construction is 97 percent complete and the status of the work is as follows:

- Installation of site entrances and access roads is complete at both sites.
- Installation of the LNG tank foundation is complete at both sites.
- Raising of the LNG outer tank roof is complete at both sites.
- Installation and welding of the outer LNG tank is complete at both sites.
- Installation and welding of the inner LNG tank is complete at both sites.
- Hydro-test on the inner LNG tank is complete at both sites.
- Installation of the LNG tank containment is complete at both sites.
- Installation of the gas piping to tie into the existing gas laterals is complete at both sites.
- Installation of the equipment and administration buildings is complete at both sites.
- Installation and welding of the process piping is complete at both sites.
- Installation of electrical work is complete at both sites.
- Mechanical Completion of the tank at both sites is complete.

3. Startup & Commissioning – Bluff Creek & Ixonia

- Bluff Creek Facility was placed in service on 11/30/2023
    - Bluff Creek LNG tank level was at 51 feet as of 12/31/2023
- Ixonia Facility start-up, commissioning and testing are in progress

We Energies
Bluff Creek & Ixonia Liquefied Natural Gas (LNG) Facilities
Docket 5-CG-106
Q4 2023 Progress Report

3. Status of Permits

Federal	**Bluff Creek**	**Ixonia**
USACE – Clean Water Act – Section 404	Not Applicable	Issued 5/31/2022
USACE – Rivers & Harbors Act – Section 10	Not Applicable	Issued 5/31/2022
State	**Bluff Creek**	**Ixonia**
PSCW - Certificate of Authority	Issued 12/22/2021	Issued 12/22/2021
WDNR - Air Permit (NR 406 & 407)	Issued 7/01/2021	Issued 7/01/2021
WDNR - Construction Site Erosion Control & Stormwater Management Permit (NR 216)	Issued 8/31/2021	Issued 8/31/2021
WDNR – Wetland and Waterway Permits (Ch.30 and Ch. 281.36)	Not Applicable	Issued 1/10/2022
WDNR – Clean Water Act – Section 401 Water Quality Certification	Not Applicable	Issued 1/10/2022
WDNR – WPDES General Permit for Discharges (WI-A057681-05-0)	Issued 7/14/2021	Issued 7/14/2021
Local	**Bluff Creek**	**Ixonia**
Town and County - Conditional Use Permit	Issued 8/20/2020	Issued 12/3/2020
County – Flood-zone Permit	Not Applicable	Issued 9/20/2021

4. Actual & Estimated Project Cost as of December 30, 2023

	Bluff Creek	**Ixonia**
Land and Land Rights	[redacted]	
Structures and Improvements		
Mains		
Measuring and Regulating Equipment		
Subtotal	**196,062,576**	**198,403,976**
AFUDC	17,058,963	17,631,930
Total Actual Cost to Date	**196,062,576**	**198,403,976**
Estimate at Completion (without AFUDC)	**203,500,000**	**203,682,197**
Estimate at Completion (with AFUDC)	**220,558,963**	**224,139,380**

State of Wisconsin
Governor Tony Evers

Department of Agriculture, Trade and Consumer Protection
Secretary Randy Romanski

September 29, 2023

Secretary Randy Romanski
Department of Agriculture, Trade and Consumer Protection
2811 Agriculture Drive
Madison, WI 53718

Dear Secretary Romanski:

As supporting staff to the 2022-23 Livestock Facility Siting Technical Expert Committee (Committee), I am pleased to present you with the Committee's final report, which satisfies the requirement in s. 93.90(2)(d), Wis. Stats., to secure expert advice as part of the review of Ch. ATCP 51, Wis. Admin. Rules, the livestock facility siting rule.

The Committee was composed of experts from the public and private sectors who were selected based on their knowledge and experience with the technical, procedural and administrative standards covered under ATCP 51. This report provides a series of recommendations that the Committee developed in response to discussion guides prepared by the department. The Committee discussion guides were drafted to include considerations for the economic and other factors listed in s. 93.90(2)(b), Stats., relevant to the development of ATCP 51.

The Committee offered recommendations for technical, procedural and administrative actions related to the standards for local approval of livestock facilities in ATCP 51. Individual recommendations range in specificity for a number of reasons, including the complexity of the subject matter and the current state of research. Some recommendations suggest further investigation and general guidance from the department.

On behalf of all department staff who supported the committee, I wish to extend our appreciation for the opportunity to share the Committee's work.

Sincerely,

Timothy Anderson, RS
Bureau Director, Land and Water Resources
Bureau of Land and Water, Division of Agricultural Resource Management
Wisconsin Department of Agriculture, Trade and Consumer Protection

Livestock Facility Siting

Technical Expert Committee

2022 - 2023 Four-Year Review of ATCP 51:

Report and Recommendations to the DATCP Secretary

June 16, 2023

Prepared by Tim Jackson

Bureau of Land and Water Resources

Department of Agriculture, Trade and

Consumer Protection

Overview

The Technical Expert Committee (Committee) was convened as part of the Department of Agriculture, Trade and Consumer Protection's (DATCP) charge under s. 93.90(2)(c), Wis. Stats. to review Ch. ATCP 51, Wis. Admin. Code (ATCP 51) at least once every four years. In December 2022, DATCP Secretary Randy Romanski appointed ten members to serve on the Committee. Composed of members with qualified expertise in nutrient management, runoff management, agricultural engineering, livestock production, local code administration, local governance and public health, the Committee was tasked with reviewing the standards for local approval in ATCP 51. The committee offered recommendations for technical, procedural and administrative actions related to the standards in ATCP 51.

Supported by DATCP staff, the Committee met on seven occasions from December 2022 to June 2023. At its first meeting, the Committee was briefed on the content of ATCP 51 as well as the review process and expectations. Advisors to the Committee were selected for each meeting based on that meeting's topical focus and served only to inform the Committee during its discussion. The five subsequent meetings focused on nutrient management, waste storage, runoff management, odor and setbacks, and general standards, respectively. The seventh meeting concluded the review process by finalizing this report. Meeting materials, including the list of discussion items and minutes, are located on the Committee's webpage: DATCP Home Livestock Siting: Technical Expert Committee (wi.gov).

The recommendations in this report reflect the Committee's discussion of the items presented for their discussion. Both consensus and non-consensus recommendations are included. The Committee's recommendations are arranged, in chronological order, according to the meeting that they were offered at. Each recommendation is numbered for reference within a meeting, not according to priority. Appendices to this report provide a more detailed description of the Committee background and process, a list of all Committee members and a map of all reported livestock facility siting ordinances and permits. As required by law, this report will be forwarded to DATCP Secretary Randy Romanski for consideration.

Committee Recommendations

January 27, 2023 Meeting on the Nutrient Management Standard

1. The Committee, as a consensus, recommends updating ATCP 51.16 to require compliance with the 2015 version of the NRCS 590 technical standard for nutrient management.

    - The Committee could not identify any other local programs or permits that use the 2005 version of NRCS 590 and suggested its use is outdated. SnapPlus, the software that is used to prepare nutrient management plans is already designed to help users meet the 2015 version of NRCS 590. The Committee also discussed that the standard was updated for a reason in 2015 and that failing to update ATCP 51.16 to match does not meet the obligations of s. 93.90(2)(b)1-7, Wis. Stats.

2. Part of the Committee recommends that ATCP 51.16 reference another state administrative rule, such as ATCP 50, to keep livestock facility siting requirements for nutrient management consistent with other state rules.

   - The Committee discussed past updates to NRCS 590 and the effect that future updates might have on producers. If an ATCP 50 reference is recommended rather than waiting for another Committee review to recommend a technical update to ATCP 51.16, would that afford operators enough time to come into compliance? Several members attested to their experience with the 2015 update and explained that there is a natural lag in implementation of updated nutrient management technical standards while SnapPlus[1] is updated, along with conservation staff affording time to producers.

3. The Committee, as a consensus, recommends adding a requirement to include the WPDES factsheet with a copy of the WPDES permit if an applicant is using the exemption afforded in ATCP 51.16(4) for Worksheet 3 of the application.

   - The Committee discussed that substituting a copy of an existing WPDES permit for the same or greater number of animal units in lieu of completing application Worksheet 3 affords operators with the presumption of compliance based on the review for their WPDES permit by the DNR. However, the exemption requires the WPDES permit be for an equal or greater number of animal units than the livestock facility siting application. There is not an explicit number of animal units included in the WPDES permit copy that is submitted to local livestock facility siting authorities. Advisors identified that there is also a WPDES permit factsheet produced as part of DNR's approval process. This factsheet contains information such as animal units and is provided ahead of public meetings. The Committee discussed the value of the WPDES factsheet to address questions related to animal units authorized by a permit while keeping the exemption in place as intended.

4. The Committee, as a consensus, recommends that livestock operators be allowed to prepare their own nutrient management plans and certify their own checklists in Worksheet 3 of the application if they meet the criteria for qualification under ATCP 50.48(2).

   - The Committee discussed that there may be potential financial benefits in authorizing qualified producers to write their own plans. Affording this option may make the 2015 version of NRCS 590 more accessible, as that is the standard SnapPlus is built to assist users with. There are existing criteria in ATCP 50.48(2), Wis. Admin. Rule to qualify operators to prepare their own plans.

[1] SnapPlus is Wisconsin's nutrient management planning software. For more information, please visit: https://snapplus.wisc.edu

March 6, 2023 Meeting on the Waste Storage and Runoff Management Standards

1. The Committee, as a consensus, recommends that DATCP review the definition for "substantially altered" under ATCP 51.01(40) to determine if it properly applies in all scenarios.

   - The committee discussed that any updates to the conservation practice standards (CPS) referenced in ATCP 51 would apply to substantially altered waste storage structures as well as new waste storage structures. The definition of "substantially altered", then, has a considerable effect in determining which existing structures must meet the updated CPS, which may add cost to a project. The Committee's discussion included how the definition of "substantially altered" applies to the use of new technologies, for example pipe boring.

2. The Committee, as a consensus, recommends updating ATCP 51.18 to incorporate the newest conservation practice standards (CPS) for new and substantially altered waste storage facilities. DATCP should consider what the best vehicle for achieving that recommendation is, whether that be through cross-referencing another state rule such as ATCP 50, or directly referencing dated versions of those conservation practice standards.

   - The Committee discussed that most counties which have manure storage ordinances already use the updated CPS. As a result, most livestock siting applicants are likely already meeting the updated CPS in counties where those manure storage ordinances exist. Private engineering consultants are also accustomed to meeting the updated CPS, even in areas where those manure storage ordinances do not exist. The Committee also noted that livestock facility siting law is intended to set uniform expectations and regulations for livestock facility operators. Using outdated CPS are therefore not meeting the intent of the law.

     The Committee expressed that while the updated CPS may have additional costs when compared to the outdated versions currently in rule that most facilities are already being designed to the updated CPS. The committee discussed that the biggest changes between the CPS referenced in ATCP 51 and updated CPS for waste storage facilities are the required separation distances and liner standards, but that only new and substantially altered waste storage structures would need to meet an updated CPS if incorporated into a revision of ATCP 51.

3. The Committee, as a consensus, recommends adding a requirement to include the WPDES factsheet with a copy of the WPDES permit if an applicant is using the exemption afforded in ATCP 51.18(7) for Worksheet 4 of the application.

   - The Committee discussed substituting a copy of an existing WPDES permit for same or greater number of animal units in lieu of completing application Worksheet 4. The Committee asked what the WPDES permit evaluation is like for CAFO waste storage and what is reported on the WPDES permit factsheet for waste storage, which was recommended for inclusion in the exemption requirements during the January 27 meeting. WPDES permits are evaluated for approval of new, substantially altered and existing waste storage structures. Advisors reported that CAFOs generally meet the most up-to-date versions of the CPS. The WPDES permit factsheet does include a paragraph about each waste storage facility but does not include engineering details. The Committee discussed the value of requiring copies of waste storage documentation from a WPDES permit up front in a livestock siting application. It may be helpful in some situations, but for town-level review especially, it may be less efficient to increase the technical documents provided for a WPDES exemption.

4. The Committee, as a consensus, recommends that DATCP review the criteria for evaluating existing waste storage facilities under ATCP 51.18(2), specifically criteria (c).

   - The Committee discussed the five listed criteria for evaluating existing waste storage facilities and identified that criteria (c) needs review. The Committee deliberated if DATCP could review all five of the criteria but identified criteria (c) specifically as an area of the rule that may not currently be working. Criteria (c) may need more evaluation requirements outside of a visual inspection for structures greater than 10 years old. Often, the original engineering as-builts are no longer available for those structures.

5. Part of the Committee recommends that the nutrient management standard should remain the focus of waste management, rather than a size-based or time-based waste storage capacity requirement. Updating the NRCS 590 standards for nutrient management plans would address that.

   - The Committee discussed that a time-based storage requirement could qualify less risk for land applications when conditions would promote runoff, such as during winter months, but risks are location dependent. CAFOs currently have 180 days of storage requirement through their WPDES permit, but some operations just below the CAFO threshold may be presenting a higher risk of

runoff from land applications without that 180-day requirement. The Committee acknowledged that an updated (2015) NRCS 590 requirement for nutrient management plans would incorporate restrictions for areas and times of high risk for runoff from land applications.

<u>March 13, 2023 Meeting on the Waste Storage and Runoff Management Standards (Koles absent)</u>

1. The Committee, as a consensus, recommends that DATCP consider the WPDES permit timeline and aim for better consistency between it and local livestock facility siting approval, specifically the requirement for submission of engineering designs.

    - As part of an application, a livestock facility must provide all documentation to prove compliance with the standards for approval using the maximum number of animals that they apply for. For some expansions, this may require the submission of engineering designs well in advance of construction for future structures. In contrast, WPDES permits may not require submission of future structure designs until closer to construction. The Committee discussed that some consultants for WPDES permitting facilities will provide thorough documentation to a livestock facility siting authority up front if they know what staff need to verify compliance. The Committee agreed that the livestock facility siting review process should aim to be consistent with the WPDES permit review process when a WPDES permit is used as an exemption.

2. The Committee, as a consensus, recommends updating ATCP 51.20 to incorporate the newest conservation practice standards (CPS) for new and substantially altered animal lots and feed storage structures. DATCP should consider what the best vehicle for achieving that recommendation is, whether that be through cross-referencing another state rule, such as ATCP 50, or directly referencing dated versions of those conservation practice standards.

    - The Committee expressed that copies of old versions of NRCS CPS can be hard to find and administering them alongside other local ordinances that apply different CPS is difficult. Most livestock facilities are meeting the newer version of CPS as required elsewhere and most private consultants want to use the newest versions. The Committee discussed the effect of applying a newer version of CPS on farms under the CAFO threshold and potential impacts on expansion efforts, as the changes to NRCS CPS 635 in 2012 were substantial compared to the 2002 version. The newer versions address additional areas for runoff risk compared to the older versions. However, application of this

standard could incur additional costs or prohibitions on existing facilities with environmentally sensitive areas when expanding.

The Committee also discussed that referencing ATCP 50 may be better for creating consistency across programs and locally adopted regulations. The Committee affirmed its understanding that updated standards in ATCP 51 would only apply to new permits, not previously approved permits, and only to new or substantially altered animal lots and storage structures. For the context of this report "permits" refers to conditional use permits, licenses and other permits administered as part of a livestock facility siting approval.

3. The Committee, as a consensus, recommends that existing feed storage structures should be required to be evaluated for risk of discharge or leaching.

   - The Committee discussed that updating NRCS CPS 635 would include CPS requirements for feed storage where the 2002 version has none. The Committee affirmed updated standards in ATCP 51 would only apply to new permits, not previously approved permits. Additional professional judgement may strengthen the presumption of compliance for existing animal lots and feed storage structures. The Committee identified that if the required CPS were updated, Worksheet 5 would need to be revised to accommodate it.

4. Part of the Committee recommends that DATCP review the 70% moisture threshold for feed storage runoff management standards to determine if it is still the appropriate number.

   - The changes to NRCS CPS 635 in 2012 were substantial compared to the 2002 version. The newer versions address additional areas for runoff risk compared to the older versions. However, ATCP 51.20 presumes that low-moisture feed storage (<70%) is qualified to have a lower risk of leaching and excludes it from some of the listed requirements, such as collection. Some of the Committee members expressed that this threshold may not be accurate for a lower risk of leaching and therefore not protective enough of surface waters.

<u>April 11, 2023 Meeting on the Odor and Setbacks Standards</u>

1. Part of the Committee recommends the differences in maximum setback requirements for facilities above or below 1,000 AU under ATCP 51.12 be removed.

   - The Committee discussed the logistics of requiring different setback standards for facilities below and above 1,000 AU. Sometimes a facility will site or expand below

1,000 AU, then later expand above that threshold with those existing structures now sited closer than would otherwise be authorized by the above-1,000 AU setback requirement. Consistency between setbacks for facilities above and below 1,000 AU may be easier for local administration. However, requiring facilities below 1,000 AU to site structures up to 200 feet from a property line or up to 150 feet from a public road right-of way (as opposed to a max of 100 feet under ATCP 51.12(1)(a), Wis. Admin. Code) may negatively affect those facilities.

2a. Part of the Committee recommends that the department review the odor score model using the newest available research for efficacy in predicting odor.

2b. The Committee, as a consensus, recommends the department gather the newest available research on predictive odor models for use in the next Committee review.

- The Committee discussed that the odor score has varying degrees of success depending on the location and size of the facility using it. Facilities in more rural areas without close residential neighbors have few conflicts, while facilities sited within proximity to more residential neighbors have more conflicts. The success of the odor score, predicting and measuring odor, is difficult to measure as odor can be a subjective experience. The Committee identified that odor is a common cause of complaints, although these are often concentrated during a siting/expansion review and less prevalent afterwards. Odor control practices can be very costly, but facility operators do appreciate having proof of compliance for odor concerns as demonstrated by the odor score and worksheet. The Committee expressed that the current odor score is working to act as a middle ground between producers and landowners. The Committee asked if there has been any growth in the research used to create the odor score. Tim Jackson (DATCP) was not aware of anything since 2005. The Committee discussed that updates to the odor score model may be appropriate if newer research is available, such as for control practices or new odor sources. Part of the Committee felt that the review of the odor score model was more appropriately assigned to the Committee rather than the department.

3. The Committee, as a consensus, recommends that DATCP produce templates for the required incident response and employee training plans, as well as the optional odor management plans and review the odor score credits awarded for each.

- The Committee identified that there is currently minimal content required for incident response, employee training and odor management plans. A well-written incident response and employee training plan can provide great value for a livestock facility, although there may be significant cost in preparing these. Guidance for how to write these plans can be found elsewhere from stakeholder groups but none

currently exists from DATCP. The Committee discussed that improving the detail required in these plans can have broader positive effects on the operation of the facility and may address concerns from adjacent landowners without adjusting setbacks or odor standards. If more detail is given, the associated odor score credits would be more appropriate. The Committee discussed that the odor score credits given for the required incident response and employee training plans may need to be better balanced with the optional odor management plan for their actual effect on odor.

<u>May 17, 2023 Meeting on the General Standards (Roth and Heeg absent)</u>

1. The Committee, as a consensus, recommends the department clarify how local permitting authorities should construct their record of decision, including a template for example.

   - The Committee discussed that an adequate record of decision under ATCP 51.34(3) should be of benefit to both livestock facility siting authorities and livestock producers. An adequate record of decision contains clear statements of how a local decision was made using evidence in the record under ATCP 51.36. Adequate records of decision are particularly important in the event of an appeal. A DATCP template and/or example would assist permitting authorities in crafting their records of decision.

2. The Committee, as a consensus, recommends the department define "permit modification" and provide both clarity in rule and guidance for processing permit modifications.

   - The Committee concluded that permit modifications should be defined and a process by which to implement them locally needs to be clarified in the rule. Currently, livestock facility siting authorities must interpret for themselves how to handle modifications to a permit, which can lead to inconsistencies both with other livestock facility siting authorities and within a single authority's jurisdiction. Procedurally, the Committee advised that requiring review of entire new applications for minor changes to a facility's operation are neither an efficient nor favorable option for livestock facility siting authorities or livestock producers.

3. The Committee, as a consensus, recommends the definition of "permit modification" established by the department not include increases in animal units above the previously approved number.

- The Committee discussed previous TEC recommendations which included minor expansions (less than 20% increases in animal units) as permit modifications. Previous TECs cited to minor expansions needing only nutrient management updates and not changes or additions to engineered structures. Previously proposed legislative updates to s. 93.90, Wis. Stats. echoed the need to define and establish a procedure for permit modifications. The Committee also identified that WPDES permitted CAFOs have an allowance for planned expansions during their permit term, which may have factored into previous TEC discussions.

4. The Committee, as a consensus, recommends the department provide guidance for livestock facility siting authorities to monitor for compliance after a local approval is given.

   - The Committee discussed that the language in ATCP 51.34(4)(a) leaves monitoring for compliance with standards as an option for livestock facility siting authorities. Establishing monitoring as an option, as opposed to a requirement, accommodates smaller livestock facility siting authorities who may not have the capacity to conduct regular monitoring activities. Consequently, this allows for different frequencies of monitoring amongst different authorities and facilities. The Committee identified that this may lead to some facilities being monitored more often than others, even within the same authority's jurisdiction. However, other factors reflect the need to monitor more frequently such as site topography, location and historic compliance. The Committee agreed that the department should provide guidance for livestock facility siting authorities on how to conduct compliance monitoring for approved facilities.

5. The Committee, as a consensus, recommends the department follow through with its plans to align ATCP 51 with statute and code as identified in its Biennial Report Reviewing Administrative Rules dated March 31, 2021.

   - The Committee discussed the ATCP 51 items identified in the DATCP Biennial Report Reviewing Administrative Rules dated March 31, 2021 for 2017 Wisconsin Act 108 conflicts. The Committee asked when the department intended to act on their identified rulemaking plans. Jackson and Katy Smith (DATCP) were not able to identify a formalized schedule for acting as stated in the report. The Committee discussed making a recommendation to show support for the department acting on their plans soon.

6. The Committee, as a consensus, recommends the department revisit and revise its model ordinances for both licensing and zoning.

- The Committee discussed the department's model ordinances which were created shortly after the promulgation of ATCP 51. The models may be outdated as a result of other legislative changes, including but not limited to 2017 Act 67.

7. The Committee, as a consensus, recommends that the requirement for structure labels on the area map, item #9 in the application, be removed.

    - The Committee identified that both the larger area map and smaller site map require labels for all livestock structures. This duplicate requirement to identify those structures on both maps is not necessary and it can be difficult for an operator or consultant to fit the labels legibly on the larger area map.

8. The Committee, as a consensus, recommends that the department add a required acknowledgement from the applicant that the application complies with all other local ordinances.

    - The Committee discussed that the applicant certification which qualifies their application complies with other local ordinances is easily overlooked. It should require an additional acknowledgement, such as a checkbox or initials, so the applicant is more likely to see it and check all other local ordinance requirements. This will also more adequately represent the applicant's efforts to the local permitting authority.

Appendix A

Technical Expert Committee: Background and Process

As required by law, Ch. ATCP 51, Wis. Admin. Rules. (ATCP 51), was developed with advice from the Technical Expert Committee (Committee) convened in 2004. In subsequent years, DATCP has convened four Committees in 2010, 2014, 2018 and 2022 to provide advice on updates to the siting rule.

Under s. 93.90, Wis. Stats., the DATCP Secretary is required to appoint a committee of experts to review the technical standards in ATCP 51. In carrying out this requirement, DATCP committed to a process with a focus on scientific and technical matters, using a committee composed of experts from the public and private sector who were selected based on their knowledge and experience with the technical and administrative standards covered under ATCP 51.

Previous Committee

In August 2016, the ATCP Board approved a scope statement for ATCP 51, which expired in February 2020. DATCP staff prepared revisions to ATCP 51, including many of the recommendations identified by 2014-2015 Technical Expert Committee (Committee). At the ATCP Board meeting in July of 2017, board members did not approve the draft rule and directed DATCP to obtain feedback from three stakeholder groups – agricultural groups, environmental organizations, and local governments.

In December 2018, DATCP Secretary Sheila Harsdorf appointed eight members and eight advisors to serve on the 2018-19 Committee, most of whom also served on the 2014-2015 technical expert committee. Chaired by DATCP staff, the committee met on four occasions from December 2018 to March 2019. At its first meeting, the TEC was presented with a list of items to frame future discussions. Specifically, committee members were asked to consider what changes they would make to their 2014-2015 recommendations based on the department's 2017 draft siting rule and other developments in the last four years. Following the Committee's final report in March of 2019, the ATCP Board approved a hearing draft for ATCP 51 in July of 2019. The Department held six public meetings on the 2019 proposed rule revisions between August and September of 2019. The rule ultimately failed to be promulgated prior to the 2016 scope statement expiring.

Committee appointments

In December 2022, DATCP Secretary Randy Romanski appointed ten members to serve on the 2022-23 Committee, none of whom had previously served as members, and including livestock producers for the first time. The makeup of the Committee was intended to mirror the objectives identified in s. 93.90(2)(b), Wis. Stats. Which authorizes promulgation of ATCP 51. As written, in promulgating rules under par. (a), the department shall consider whether the proposed standards, other than those incorporated by cross-reference, are all of the following:

- Protective of public health or safety
- Practical and workable
- Cost-effective
- Objective
- Based on available scientific information that has been subjected to peer review
- Designed to promote the growth and viability of animal agriculture in this state
- Designed to balance the economic viability of farm operations with protecting natural resources and other community interests.
- Usable by officials of political subdivisions.

As a result, the Committee's expertise* consisted of:

10 Members	**4** Experts in the NRCS standards referenced in ATCP 51	**1** County expert in runoff management
		1 County expert in nutrient management
		1 Private consultant expert in nutrient management
		1 Private consultant expert in agricultural engineering
	1 Expert in environmental science	Representing the public health sector
	2 Livestock producers	Representing **2** different species of livestock operations
	3 Representatives from local governments	**1** county conservation department head who administers a livestock facility siting ordinance
		1 towns' representative
		1 county zoning administrator who administers a livestock facility siting ordinance

*Several of these members' qualified expertise falls into more than one category

The individual details for members and advisors are listed in Appendix B. A livestock facility siting map with member locations is attached as Appendix C.

Review scope and criteria

The Committee was charged with reviewing the existing standards for local approval of livestock facilities to ensure that ATCP 51 keeps pace with changing agricultural practices and remains environmentally protective. The Committee's approach to reviewing the technical standards in ATCP 51 was to determine if the standards meet the objectives of the legislature in s. 93.90(2)(b), Wis. Stats.

The questions posed to the Committee involved items for discussion in ATCP 51 identified by both previous Committees and DATCP staff. These items consisted of updates and clarifications to the standards for nutrient management, waste storage and runoff management, the odor score and setbacks, and general procedure within ATCP 51. Discussion of the items focused on the impacts of facility size, Natural Resources Conservation Service (NRCS) updates to standards, developments in research and new technologies, and local implementation experiences.

Meeting framework and deliberative process

Following the introductory meeting on December 22, 2022, Committee meetings took place on January 27, March 6, March 13, April 11, and May 17, 2023. During these meetings, the Committee answered all discussion questions, then reviewed and vetted all recommendations for inclusion in this report. A final meeting was had on June 14, 2023 to finalize edits to this report.

To ensure a transparent and public process related to the Committee's deliberations, DATCP committed to the following:

- Publicly notice and conduct each meeting according to the open meetings law
- Prepare minutes for each meeting
- Maintain a website to share critical documents and information, such as the committee assignment, meeting agendas, and minutes for each committee meeting: https://datcp.wi.gov/Pages/Programs_Services/LSTechExpertCom.aspx

The Committee followed ground rules intended to create an environment conducive to the free exchange of information and thoughtful deliberation on discussion items. Though the public could attend committee meetings in accordance with state law, there were no presentations by the public. This structure recognized that there will be an occasion for the public to comment and share their ideas during rulemaking related to the Committee's recommendations.

The Committee did not strictly utilize a consensus process to develop their recommendations. Because of the diverse nature of the Committee, DATCP aimed to include all parties' comments after discussion. This process allowed the Committee to complete its work in achieving final recommendations which address the items discussed.

Appendix B

Livestock Siting Technical Expert Committee 2022-2023

Members

Scott Frank – Shawano County Land Conservation Department

Travis Drier – Dunn County Land and Water Conservation Department

Nikki Wagner – Rock River Laboratory, Inc.

Emily Micolichek, PE – Miller Engineers & Scientists

Curtis Hedman, Ph.D. – Wisconsin Department of Health Services

Jay Heeg – Heeg Brother's Dairy, LLC

AV Roth – Roth Feeder Pig, Inc.

Gaylord Olson – Jackson County Land Conservation Department

Mike Koles – Wisconsin Towns Association

Matt Zangl – Jefferson County Planning & Zoning Department

Advisors

Cody Calkins – DATCP, Nutrient Management

Andrea Topper – DATCP, Nutrient Management

Tyler Dix – DNR, CAFO WPDES Permit Administration

Aaron O'Rourke – DNR, CAFO Nutrient Management

Bernie Michaud, P.E. – DNR, CAFO Conservation Engineering

Matt Woodrow, P.E. – DATCP, Conservation Engineering

Dennis Marquardt, P.E. – DATCP, Conservation Engineering

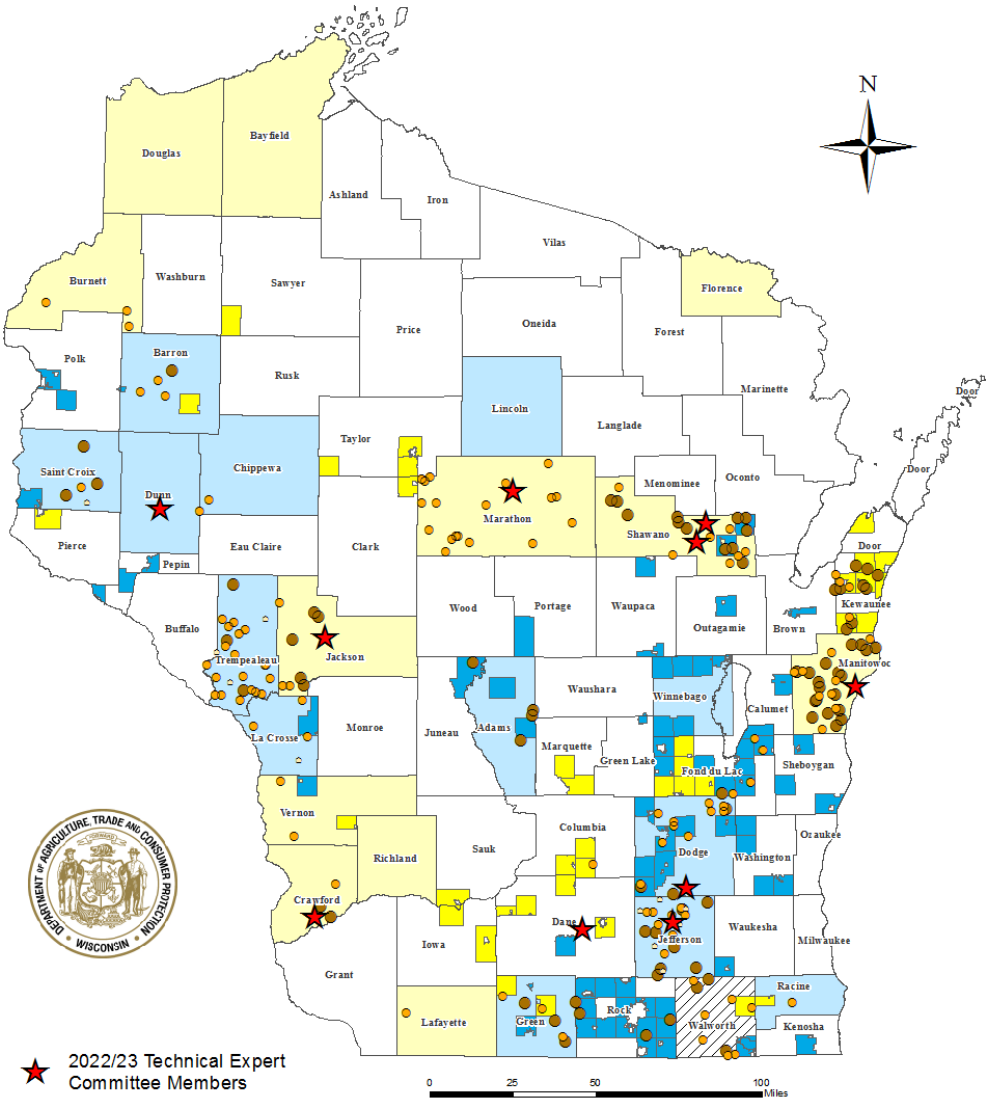
Beth Peterson, P.E. – NRCS, Conservation Engineering

Steve Becker, P.E. – NRCS, Conservation Engineering

Appendix C

Wisconsin Livestock Facility Siting Permits and Permitting Authorities

Through March 2023



Under Wisconsin's livestock facility siting law, local governments do not have to require permits for new or expanding livestock operations. However, if they choose to require conditional use or other permits for such operations, the livestock siting law (s. 93.90 Wis Stats.) sets standards and procedures that they must use. The standards address property line and road setbacks, management and training plans, odor management, nutrient management, manure storage facilities and runoff management. The law does not affect other local ordinances such as shoreland and floodplain zoning. It limits exclusion of livestock facilities from agricultural zones.

This map shows the approximate boundaries and status of 1) permitting authorities that have adopted livestock facility siting 2) generalized locations of approved livestock facility siting permits. It is intended for general reference, rather than site-specific uses. Livestock facility siting permitting authority and permit data was compiled by the Wisconsin Department of Agriculture, Trade and Consumer Protection (DATCP) and is updated for May 2023. This dataset is not an authoritative source of information about legal land ownership, parcel boundaries, or public access. DATCP does not guarantee the accuracy, applicability for a particular use, completeness, or legality of data provided by other sources. No warranty, expressed or implied, is made regarding the accuracy or utility of this data.

For more information, please visit livestocksiting.wi.gov or call 608-224-4630.

Date: 5/15/2023

WISTERIA CASTLE

More than a venue, it's an experience.

Promoting agriculture, tourism, and local businesses throughout Jefferson County and beyond.

N7040 Saucer Drive | Watertown WI 53094 | 608.698.3888 | wisteriacastle.com | FB wisteriacastle

January 2024

JEFFERSON COUNTY TOURISM

Since Wisteria Castle and the Zoning Committee last met in October, 2022, reactions and participation to the castle have been overwhelmingly positive.

Hundreds of visitors toured the castle and the look on their faces makes the stress and hard work totally worth it. Wisteria Castle has nearly 2,200 Facebook followers, which is quite a feat to gather in a single year. Our audience continues to grow as we obtain additional followers every week, more requests for tours, and great enthusiasm for events.

Those who have visited Wisteria Castle have expressed how they are so thankful we've opened up our Castle home to share with Jefferson County. They note that it is an experience or an adventure more than a building and it's been very good for Jefferson County tourism.

The gatherings and events have all be hugely successful with the guest expressing sheer joy and amazement. Nearly everyone says its the "most beautiful and unique space they have ever seen" and "plan to tell everyone they know all about the castle."

FOR CHARITY

We've hosted charity events for *Crossroads of Watertown*, *Watertown Main Street Program*, *Holiday Parade of Homes*, *Jefferson County Auto Club*, a *Chamber of Commerce* monthly meeting, a political fundraiser, church congregation tours. We allow high school students to do photo shoots for prom, homecoming, and senior photos.

FULFILLING CU CONDITIONS

We had a new $35,000 driveway/parking lot installed on our property. We have no parking and private drive signs put up. No one has parked on the nearby property owners' land. Nor has there been any street parking except for a charity event approved by the Town of Farmington. Every event is finished by 10:00 pm. There have been no outside disturbances, parties or music.

JEFFERSON COUNTY AGRICULTURE AND LOCAL VENDORS

By way of serving locally produced food at our events, we continue to promote Jelli's Market, Kraemer Wisconsin Cheese, Lewis Station Winery, M & Em's Mini Market, and Heritage

Country Meats to name a few. When we host an event, we post vendor signs next to the corresponding food we serve, promoting each of those vendors. We also post photos and vendor information on our Facebook page and website.

Paul and I have a business card and brochure display racks for local vendors to advertise their wares and is available to anyone who wishes to take a card or brochure.

Eclectic Shire Farms is a local Shire horse training and carriage business. We met Scott and Michelle and have often promoted the McAllister's by speaking with clients and tourists about their business as well as posting information on our Facebook page.

Wisconsin Farmers Market has shared our Facebook posts to their website.

There is a new, small Wisteria Castle sign at the bottom of our driveway. The sign was produced by Jason from Mindemann Farms.

EVENTS

Jefferson County is not only about agriculture. We also promote the hotels, bakeries, restaurants, caterers, shopping, Bed and Breakfasts, photographers, in person and via our website and Facebook.

Jason Mindemann Farms

In February of 2023, we hosted a wine and cheese tasting event. Vendors from Lewis Station Winery, Sunshine Brewery, Crave Brother's Farmstead Cheese, Heritage Country Meats, and Chandler House Bakery.

For Saint Patrick's Day, we held a murder mystery event. Carla's Catering provided the meal. Chandler House Bakery provided desserts. Lewis Station wines could be purchased from our in-house beer/wine bar.

In April of 2023, we invited vendors from all over Southeastern Wisconsin to participate in a Mini-Renaissance Fair. Vendors such as Banjo Turkey Leather Works, Beaker Stew Leather, Simone's Chapeaux, and M & Em's Mini Market. Food was provided by Glenn's Market and Catering, Chandler House Bakery, Heritage Country Meats, Fiesta Garibaldi, and Nottingham Nectar and Lewis Station Winery.

Gebel Girls (a local sister music group and finalist in season 2023 “The Voice”) performed at Wisteria Castle in August, 2023. Food and beverages were provided by Kraemer Wisconsin Cheese, Jelli’s Market, M & Em’s Mini Market, and Sweet Talkin’ Treats and Lewis Station Winery.

We hosted a Halloween gathering in October, 2023 and purchased pumpkins from Jelli’s Mini Mart for our decorative displays and served locally produced goods from M & Em’s Mini Market, Kraemer Wisconsin Cheese, and Sweet Talkin’ Treats Bakery and Lewis Station Winery.

In January, 2024 we are hosting another murder mystery. Foods will be served from Jones Dairy Farm and Sassy Sweets. Wine from Lewis Station and mead from Nottingham Nectar will be available for purchase.

CONTINUED SUPPORT FOR AGRICULTURE, TOURISM, AND LOCAL BUSINESSES

Though Wisteria Castle is still in it’s infancy, and still has many agriculture businesses to visit and promote, we will continue to support agriculture, local businesses, and tourism in Jefferson County because we feel it is important to be a part of a community, to frequent their stores and shops, and to share positive comments and suggestions to our guests about this amazing corner of Wisconsin.


HERITAGE COUNTRY MEATS


LEWIS STATION WINERY


CHANDLER HOUSE BAKERY


CHURCH GROUP TOUR


VISITORS FROM CHINA!

CU2058-20

Wisteria Castle CUP Conditions of Approval

1. Total number of invitees for any event shall not exceed 50. This does not include staff, owners, or their family members.

   We have complied with the number of guests to be 50. We held three fundraisers in 2023 which each went over the number of guests allowed. However, these events were hosted by Dianne Owens and Paul Elliott; not by Wisteria Castle LLC, and we received no compensation for these events.

2. Days and hours of operation include any day of the week between 9:00 a.m. and 10:00 p.m. There is no limit to the amount of events held on any day before 6:00 p.m. Property owner is limited to a total of four events after 6:00 p.m. in any seven-day period.

   As of now, we've hosted no more that two or three gatherings per month. No event has gone past 10:00 pm. We would like to request that this condition be removed if possible as we have 100% complied.

3. All events shall occur inside the Wisteria Castle structure including, but not limited to, alcohol, food service, dining, music, and entertainment. There shall be no tents outside. Any gatherings outside shall be for the purpose of accessing and exiting Wisteria Castle, photographs, and for other activities incidental to the event being held.

   Have not deviated from this condition.

4. Parking for events shall be in accordance with the updated Parking Plan dated August 27, 2022 submitted and approved by the County (the "Parking Plan"). If necessary, additional parking is permitted on the driveway constructed following issuance of this conditional use permit. At no time shall there be event parking permitted on the currently existing shared driveway. Parking is not permitted within the road right of way unless permitted by the Town of Farmington. There has be no vehicles on shared drive during our gatherings.

   We had a new driveway and parking lot installed in 2022 with 26 stalls. ($30,000) We continually check the parking to ensure there are no vehicles on the shared driveway or parked on the side of the road. Six additional stalls are available at top of driveway near castle. We also place three orange cones at them bottom and top of the shared driveway during events to ensure no vehicles are on that driveway at any time.

   In early December, 2023 we, and four other homes, participated in a fundraiser for Watertown Parade of Homes. At that time, the total number of cars were to exceed our maximum. We contacted the Town of Farmington, and were given permission for road-side parking for that fundraiser .

   All of the Wisteria Castle-hosted events have only utilized Wisteria Castle parking on our property.

5. A new driveway shall be installed with lights and signs as shown in the approved Parking Plan and in accordance with the plans and specifications approved by the Town of Farmington. Prior to the installation of the driveway, the property subject to this conditional use permit may only hold events that do not exceed 8 motor vehicles and parking for such events may occur only on the property owners' driveway and not on the shared driveway.

We had a new driveway and parking lot installed in 2022 with 26 stalls. "NO PARKING/ PRIVATE DRIVE" signs are placed at the bottom and top of shared driveway. Cones are also placed on the shared driveway to prevent vehicles from entering or exiting. We are currently in the process of installing the lights and end-of-driveway gate. Time, costs, and now weather have been a factor.

6. Vegetative screening shown on the south side of the proposed driveway in the Parking Plan approved by the County shall be installed/planted on or before June 2Pt, 2023. This vegetative screening shall be extended an additional 75 feet to the east as reflected on the Parking Plan and may include shrubs between 6 to 8 feet in height at maturity or a fence between 6 to 8 feet. Screening shall be in compliance with Section 11.07(c) of the Jefferson County Zoning Ordinance.

   We purchase 13 trees from Blodgett's Garden Center. Ruby Tears Crabapple, Firebird Crabapple, and Tina Crabapples. Unfortunately only three have survived. Per Laura at Blodgett's Garden Center, they will replace ALL trees in Spring of 2024 which we will plant as soon as they arrive. We don't want to put a fence anywhere between Wisteria Castle's driveway and the shared driveway because it is a thoroughfare for many types of wildlife.

7. The uses permitted under the conditional use permit of *Agricultural Tourism, Wine Tasting Room* and *Retail Sales of Agricultural Related Items not Grown on the Premises* includes, but is not limited to, weddings, funerals, farmer's markets, wine tastings, corporate/social gatherings, and other events involving the gathering of individuals so long as such events provide for the sale or presentation of locally grown agricultural products.

   We tried to resell products such as Hubbleton Brewery and Sunshine Brewery, however, we have incurred losses because these items do not sell in our winery/pub. We continuously serve locally-produced goods at every one of our events of which we place vendor-signage next to their goods and we continually discuss with our guest how important it is for us to use locally produced goods as well as patronizing local businesses. We cannot sell perishable goods because the events are too far and between and we would incur extreme losses from spoilage

   We have had local vendors sell their own products at some of our events such as Lewis Station Winery, Em & M's Mini Market, Heritage Meats, Crave Brothers Cheese, Sunshine Brewery, and more.

   We would like to host a "Harvest Fest" in the fall for many local producers as well as show livestock such as Shire horses with carriage rides, however, we would need a special dispensation from the Zoning Committee to hold such an event outdoors with a likely higher head/vehicle count.

8. Family gatherings held on the property subject to this conditional use permit consisting of members of the property owners' family and their guests shall not be regulated as a conditional use or be subject to the conditions in this conditional use permit.

9. This conditional use permit shall be reviewed on an annual basis starting one year from the first event held under this conditional use permit by the Planning and Zoning Committee to ensure that the property and activities subject to this conditional use permit are in substantial compliance with all conditions stated herein. Adjacent landowners to the property subject to this conditional use permit shall be notified at least 14 days prior to the annual review. At the annual review, the property owners must provide evidence that the property subject to this conditional use permit was used as a *Wine Tasting Room,* and/or for *Retail Sales of Agricultural Related Items not Grown on the Premises* and/or for *Agricultural Tourism* and the number of events held.

   We ask that this condition be removed. We have had nine weddings and request the wedding party purchase their catered meal from local producers. Often the bride/groom ask for our suggestion on who would be a suitable cater for them. We also have a number of business cards, brochures, and

literature, displayed in our dining hall.

Wisteria Castle hosted five events in 2023. Again, we purchase foods from local vendors to offer our guests. We also held a Renaissance Fair where vendors sold leather ware, jewelry and food products.

We do not sell fruits and vegetables for take home, because we are left with a significant amount of waste. Locally produced wine is always sold at our events.

10. This conditional use permit and its terms do not run with the land and are specific to the owner or owners of the property who petitioned for the conditional use permit. A change in ownership requires obtaining a new conditional use permit. However, this conditional use permit may be transferred to an entity owned by the property owners, and upon such transfer, a new conditional use permit shall not be required, and this conditional use permit shall remain in full force and effect. The Jefferson County Planning and Zoning Committee shall be provided written notice if Dianne Owens or Paul Elliot no longer have a majority ownership interest in the entity holding the conditional use permit at which time the Planning and Zoning Committee will conduct a review of the Conditional Use Permit and related conditions to determine whether or not the Conditional Use Permit will continue or if the related conditions should be modified.

    There are no plans to sell our business at this time.

11. This conditional use permit can be revoked at any time upon a finding that the property owners are not in substantial compliance with these conditions.

    We understand this.

12. Landowners must remain in compliance with all federal, state, and local laws and regulations affecting this property subject to this conditional use permit.

    We are in compliance with Federal, State, and Local laws.

N2349 County Rd D, Fort Atkinson Update as of 12/19/23

Unfortunately, the surrounding land owners do not wish to sell off any part of the surrounding parcels, like I had hoped. Matt Zangl has been very helpful and did inform me that in the ordinance, it states that you are able to use a separate parcel if it is within 400 feet. I have been utilizing the Hebron Community Center parking, coordinating with them each time I need it. Our parcels are about 288 feet apart. The Hebron Community Center has 30+ parking spots. We have 18 parking stalls at the Venue, so for smaller events, I do not use the separate lot. Parking has worked out well so far with this system. We have held three events so far, a wedding ceremony, a celebration of life and an open house. We opened in late October and are still trying to get the word out. Feel free to schedule the site visit whenever you would like.

Thank you!

-Grace Foelker, Owner

DECISION OF THE JEFFERSON COUNTY PLANNING & ZONING COMMITTEE

CONDITIONAL USE PERMIT

I. FINDINGS OF FACT:

Petition # 2022 CU2075 Township: Hebron

Site Inspection Date: 12/9/2022 Hearing Date: 12/15/2022

Petitioner Name: Hebron Community Methodist Church

Property Owner(s): Grace Foelker

Property Location: N2349 County Road D

CONDITIONAL USE REQUEST: To allow for an event venue in the existing structure located at N2349 County Road D.

PARCEL(S)(PIN#): 010-0515-0224-015 (.830-ac)

ADJACENT LAND USE: A-1, Exclusive Agriculture; C, Community

COMMENTS/ADDITIONAL INFORMATION RECEIVED AT PUBLIC HEARING:

-Holding Tank Permit Received, need approval from Commitee. -Confirm hours, all year events? HRS AS SUBMITTED 11 AM TO 12 AM -DSPS Approvals. -Lighting? NONE NEW NOW -Parking Plan? USING COMMUNITY CTR -PURSUING purchase of land for more parking

TOWN BOARD RECOMMENDATION 11/14/2022 ☑ Approval ☐ Denial ☐ Postponed ☐ No action

Note: Town Board recommendation does not constitute final county action. See Sec. III Order & Determination

II. CONCLUSIONS

BASED UPON THE FINDINGS OF FACT, THE CONDITIONAL USE FILE, SITE INSPECTION, PUBLIC HEARING, ZONING ORDINANCE, AND THE AGRICULTURAL PRESERVATION AND LAND USE PLAN, THE PLANNING & ZONING COMMITTEE CONCLUDES THAT THE PROPOSED CONDITIONAL USE ☑ Complies ☐ Does Not Comply

FOR THE FOLLOWING REASONS: It's an existing building to be used that is located within the Community. Event use has always been in this structure.

III. ORDER & DETERMINATION

Based on the findings of fact, conclusions and the record herein, the committee recommends that the conditional use be: ☑ Granted ☐ Denied ☐ Postponed

Motioned by: Matt Foelker 2nd by: Blane Poulson Vote: 4-0 Date: 12/19/2022

WITH THE FOLLOWING CONDITIONS: There shall be a follow-up one year from the date of approval for an update on the parking situation.

Date 12/22/22 Signature Brett Schurr

Wisconsin Department of Safety and Professional Services
Division of Industry Services
4822 Madison Yards Way
PO Box 7302
Madison, WI 53707

Phone: 608-266-2112
Web: http://dsps.wi.gov
Email: dsps@wisconsin.gov

Tony Evers, Governor
Dan Hereth, Secretary

5/22/2023

PETER WESTON
THE DESIGN ALLIANCE ARCHITECTS
1003 MADISON AVENUE
FORT ATKINSON, WISCONSIN 53538

Identification Numbers
Plan Review No.: CB-052300778-PRB
Application No.: DIS-042319338
Site ID No.: SIT-115169
Please refer to all identification numbers in each correspondence with the Department.

CONDITIONAL APPROVAL

PLAN APPROVAL EXPIRES: 05/22/2024
CODE APPLIES: 04/25/2023

MUNICIPALITY:
TOWN OF HEBRON
JEFFERSON COUNTY

SITE:
WEDDING VENUE
N2349 COUNTY ROAD D
FORT ATKINSON, WI 53538

FOR:
N2349 COUNTY ROAD D

Building Name: Wedding Venue
Object Type: Building
Major Occupancy: A-2 - Dining & Drinking Assembly
Class of Construction: VB - Combustible Unprotected Construction
Building Review Type: Alteration
Plan Type: Full/Complete Building
Total Floor Area in Sq Ft: 931
Sprinklered Type: None
Occupancy: None:
Structural Components Included in Review: None
Alteration Level: None

SITE REQUIREMENTS

- Contact both the State Inspector and the local municipality PRIOR to the start of construction.
- A full size copy of the approved plans, specifications and this letter shall be on-site during construction and open to inspection by authorized representatives of the Department, which may include local inspectors. If plan index sheets were submitted in lieu of additional full plan sets, a copy of this approval letter and index sheet shall be attached to plans that correspond with the copy on file with the Department. If these plans were submitted in an electronic form, the designer is responsible to download, print, and bind the full size set of plans along with our approval letter. A Department electronic stamp and signature shall be on the plans which are used at the job site for construction.

The following conditions shall be met during construction or installation and prior to occupancy or use:

SUBMIT:

- **SPS 361.30(3)** - This approval does not include heating, ventilating or air conditioning. The owner should be reminded that HVAC plans, calculations, and appropriate fees are required to be submitted for review and approval prior to installation in

the field. The HVAC plans shall be submitted on the DSPS website. Building Designer should coordinate with HVAC design to avoid problems with clearance to combustibles, dampers etc. The submitted HVAC plans and calculations shall match the approved building plans. Building Designer is requested to provide a complete set of plans, Energy Calculations and the Building plan review Transaction I.D. number to the HVAC Designer to help coordinate review. Note as per SPS 302.10 installation of HVAC without approved plans could result in double plan review fees.

KEY ITEMS:

- **SPS 361.31** - These plans were conditionally approved electronically. The designer is responsible to download the plans, print out complete sets and permanently bind each set of the conditionally approved electronic plans, along with a complete bound set of specifications, as submitted to the Dept., for reference in the field. Plans for field reference shall be the same size and scale as originally submitted to the Dept. per SPS 361.31(2)(a), and per SPS 361.31(2)(d) shall be clear and legible. A complete bound conditionally approved set of plans and set of specifications shall be made available to a Dept. representative on-site upon request. There shall be an electronic stamp and signature on the index page of the conditionally approved plans by the Dept. representative that conditionally approved the plans, as well as the professional of the project if the building is over 50,000 cubic ft. Additionally, a copy of the conditional approval letter issued by the Dept. shall be permanently attached to each of the conditionally approved plan sets.
- **SPS 361.31(2)** - Lighting plans, including both Emergency Egress (IBC) & Energy Conservation (IECC), are no longer required to be submitted to the department for review and approval. However, the requirements in both codes must still be met. One (1) set of plans, calculations and/or fixture cut-sheets with all items stamped and signed by a WI registered professional as required by SPS 361.20 & 361.31(1) shall be on-site and made available to inspection by the Department or its authorized representative.

REMINDERS:

- **ICC/ANSI A117.1 Sec. 502** - A minimum of one accessible van parking space shall be provided that is a minimum 8 foot wide with an adjacent 8 foot wide access aisle. Vertical clearance of 98 inches shall be provided at the van parking space, the vehicular entrance and exit routes serving it, and the access aisle. Neither the parking space nor the access aisle shall have a slope greater than 1:48.
- **IBC 1012.7.2** - Design outdoor ramps and outdoor approaches to ramps such that water will not accumulate on walking surfaces. The owner is responsible for keeping the outdoor stairs clear of snow and ice so that they are usable at all times.
- **SPS 361.36(1)(c)** - This approval will expire 1 year after the date of this letter if the work covered by this approval is not completed and the building ready for occupancy within that year. This conditional approval is only for the altered portions and systems of the building shown on the plans. All other areas of the building have not been reviewed and are not a part of this approval.

- The submittal described above has been reviewed for conformance with applicable Wisconsin Administrative Codes and Wisconsin Statutes. The submittal has been CONDITIONALLY APPROVED. The owner, as defined in chapter 101.01(10), Wisconsin Statutes, is responsible for compliance with all code requirements. Only those object types listed above have been approved; other submittals such as plumbing and those listed above under REQUIRED SUBMITTAL(S), may also be required.
- All permits required by the state or the local municipality shall be obtained prior to commencement of construction/installation/operation. You are responsible for complying with state and federal laws concerning construction near or on wetlands, lakes, and streams.
- This plan has not been reviewed for compliance with fire code requirements, including those for fire lanes and fire protection water supply, so contact the local fire department for further information.
- In granting this approval, the Division of Industry Services reserves the right to require changes or additions, should conditions arise making them necessary for code compliance. As per state stats 101.12(2), nothing in this review shall relieve the designer of the responsibility for designing a safe building, structure, or component. The Division does not take responsibility for the design or construction of the reviewed items.
- Per s. SPS 361.40(4), projects for buildings of over 50,000 cubic feet total volume shall have supervising professionals who file compliance statements with this agency and the local code officials prior to occupancy of the project. Compliance statements shall be filed online at https://esla.wi.gov/PortalCommunityLogin.

Inquiries concerning this correspondence may be made to me at the contact information listed below, or at the address on this letterhead.

Sincerely,

Mark Piquette
Building Plan Reviewer
Division of Industry Services
Phone: 262-574-2121
Email: mark.piquette@wisconsin.gov

cc:
JOHN GIBBS, DIS INSPECTOR, (414) 852-3694, JOHN.GIBBS@WISCONSIN.GOV
KATHLEEN GROSS, MUNICIPAL CLERK, , GROSSK@CENTURYLINK.NET
GRACE FOELKER,

Jefferson County Zoning Committee

Dear Committe,

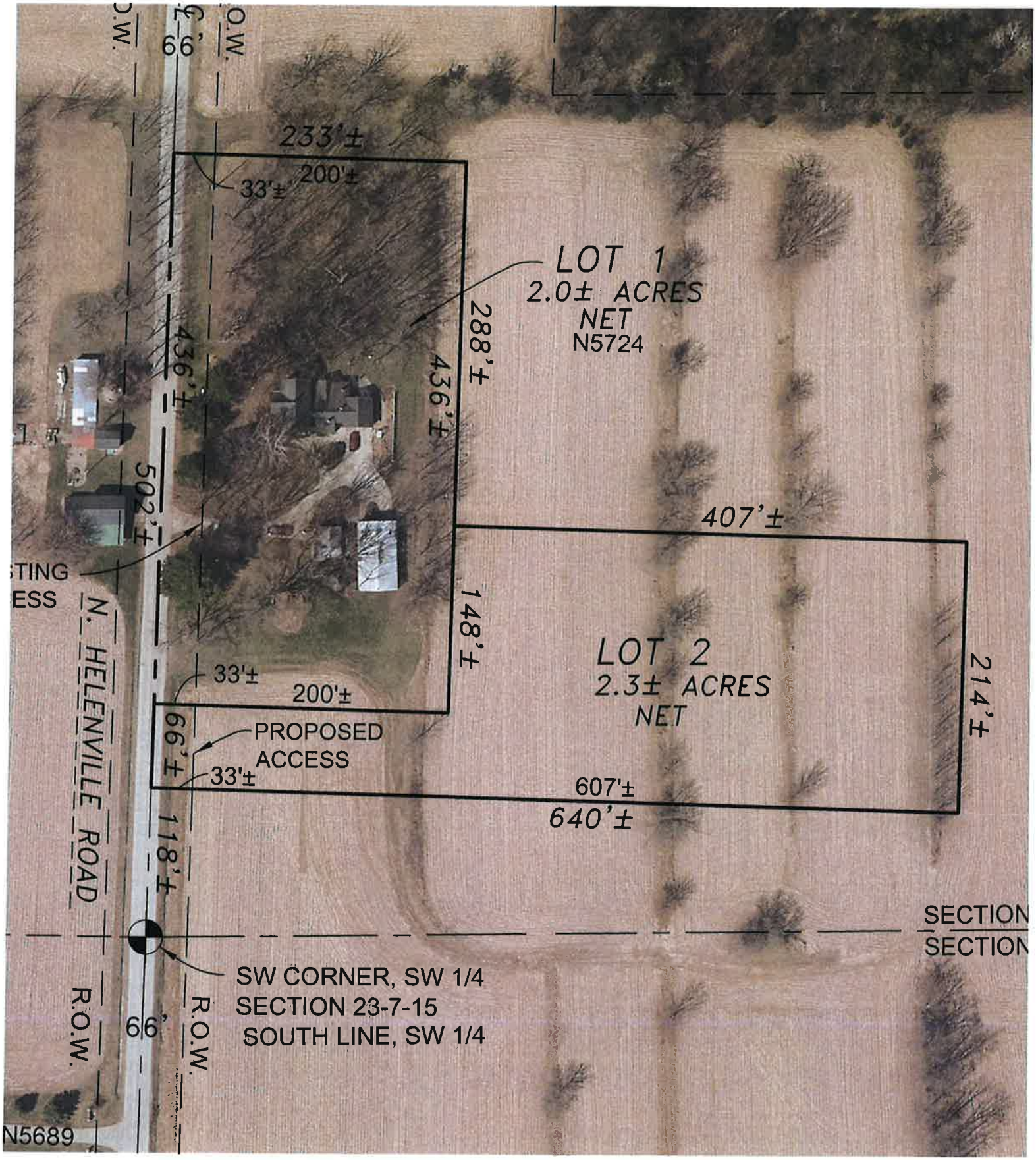
The reason for the initial lot design was to stay within the zoning ordinance and create a 2-acre lot that fit within those guidelines. I met with Matt and went over some other lot design options.

I would prefer that I don't have to start the whole process over again and am grateful that you didn't just reject it. I would prefer my initial lot proposal, but my second option would also be acceptable to my wife and I.

My intention is to be at the next meeting so if you have any questions or suggestions, I will be there to entertain them.

Regards,

Peter Q. Gu


O.W.
66'
O.W.
233'±
200'±
33'±
LOT 1
2.0± ACRES
NET
N5724
288'±
436'±
436'±
502'±
407'±
148'±
LOT 2
2.3± ACRES
NET
214'±
33'±
200'±
66'±
PROPOSED
ACCESS
33'±
607'±
640'±
118'±
N. HELENVILLE ROAD
SECTION
SECTION
SW CORNER, SW 1/4
SECTION 23-7-15
SOUTH LINE, SW 1/4
66'
R.O.W.
R.O.W.
N5689

Christopher Mueller
W2844 River Ridge Lane
Watertown, WI 53094
920-941-0313

February 12, 2024

Dear Jefferson County Planning and Zoning Committee,

I am requesting an exception to the prohibition of a holding tank for new construction at the following adjacent properties:

Tax Parcel Information: 032-0815-2411-014 (Lot 7, BLK 1, Rock River Paradise)

Tax Parcel Information: 032-0815-2411-015 (Lot 6, BLK 1, Rock River Paradise)

A soil test was conducted on February 2, 2024 by Klein Excavating & Septic with test holes dug on each parcel. None of the test holes indicated suitability for an A+4 mound type system. A representative from Jefferson County was on site to visually verify each test hole. The results of the soil testing will be filed by Klein Excavating & Septic with Jefferson County identifying the specific facts of the soil test as to why an exception is being requested.

Both parcels are located on the Rock River, zoned R-2 in an established residential sub-division (Rock River Paradise). I am seeking to build a 2 bedroom single family home (<1200 square feet) on each parcel. The north half of each lot is in the flood fringe of the floodplain. If the exception for the use of a holding tank is granted, I would continue to work through the process of following all requirements for a residential use home within the flood fringe on each parcel, including but limited to:

- The house is raised so the first floor elevation is 2' above the floodplain elevation.
- The house is located/raised on fill, with the fill extending for 15' beyond the limits of the house.
- The house must have dryland access.
- All work will be designed and approved by an engineer and surveyor, with the engineer signing off stating that the house and fill will not affect the floodplain.

Thank you for considering my request to grant permission to use a holding tank for new construction. If approved, the public interest in safe and healthful sanitation arrangements will not be jeopardized. I ask the Planning and Zoning Committee to consider this situation unique and grant the exception.

Sincerely,

Christopher Mueller

Property Owner

(a) A temporary holding tank may be installed if a public sewer, approved by the Department of Natural Resources, will be installed to serve the property within 2 years of the date of the sanitary permit issuance. An application for a sanitary permit for a holding tank shall include, in addition to what is required in SPS 383 and this ordinance, written statements from:

1. The municipality or sanitary district verifying the date the public sewer will be installed and available to serve the property.
2. The Department of Natural Resources verifying approval of the public sewer, and
3. The property owner agreeing to connect to public sewer when it becomes available, and to properly abandon the temporary holding tank.

If public sewer does not become available within 2 years of the date of sanitary permit issuance, the holding tank must be replaced with another type of system recognized by SPS 383 unless conditions identified in par. (7)(b), (8) and (9) apply.

(b) Soils and site evaluation has determined that the only available area is located within the 100-year floodplain.

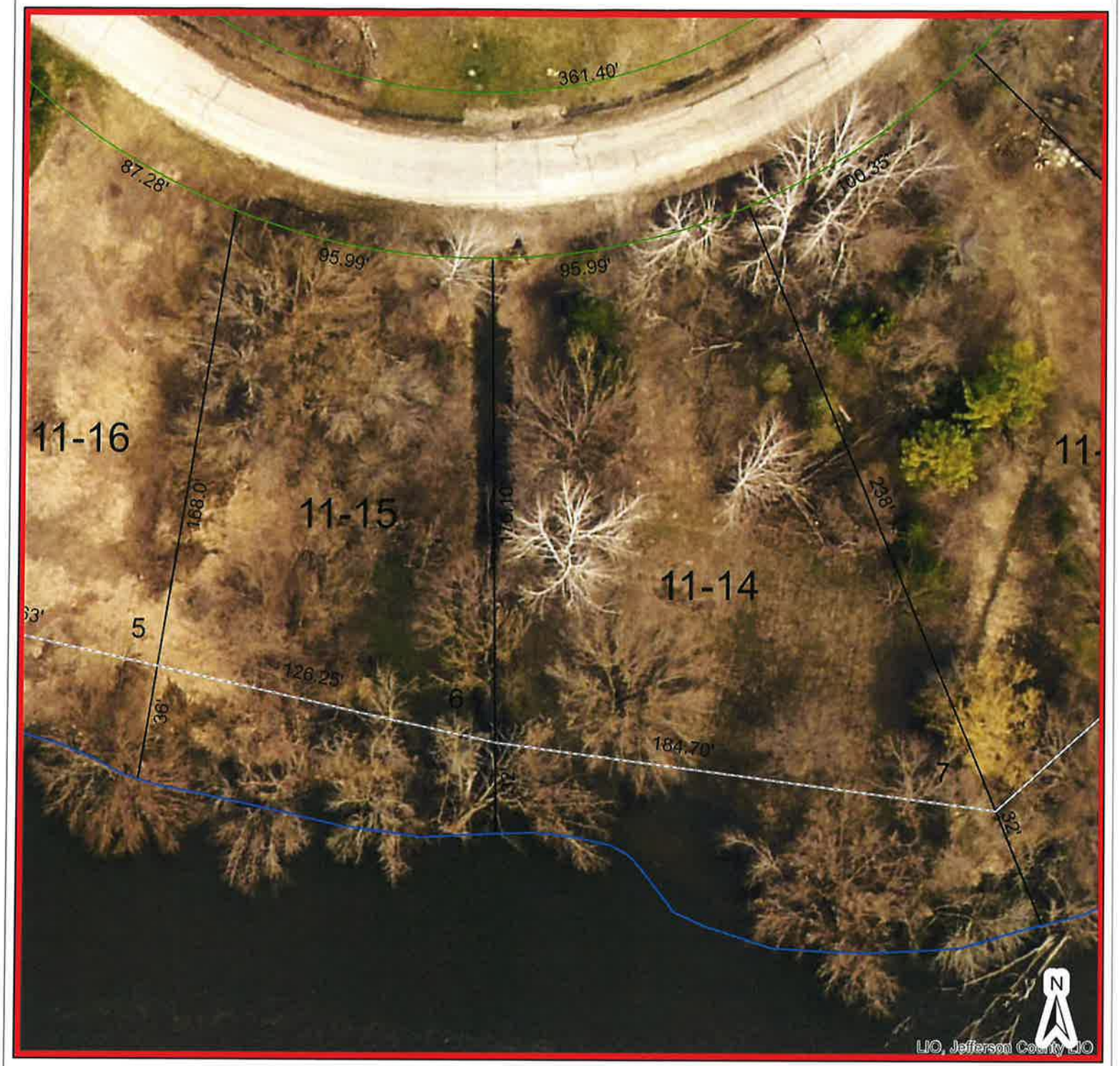
(8) Installation of a temporary holding tank may be approved by the County in cases where an approved POWTS may not be fully installed due to weather or other circumstances. The system shall be fully installed within one year of the approval of the temporary holding tank. The County may grant an extension on a case-by-case basis. Upon approval, the plumber and/or property owner shall submit the following:

(a) Holding Tank Maintenance Agreement
(b) Holding Tank Servicing Contract
(c) Applicable fees required by the County
(d) Permit application

(9) Exceptions to allowing holding tanks for new construction may be granted when the public interest in safe, healthful sanitation arrangements will not be jeopardized, and where the applicant's situation is truly unique, such as, the likelihood of public sewerage service being available at a reasonable future time.

Applications for an exception shall be made to the Planning and Zoning Department which shall refer the application to the Planning and Zoning Committee. Applications shall include written statements from the owner requesting the exception and plumber and/or soil tester documenting the specific facts as to why an exception is requested. The Committee shall make necessary investigations, meet with the applicant or agent thereof, and shall determine whether or not to grant the exception.

Jefferson County Land Information



- Municipal Boundaries
- Right of Ways

Parcel Lines

- Property Boundary
- Old Lot/Meander Lines
- Rail Right of Ways
- Section Lines
- Surface Water
- Map Hooks
- Tax Parcel Information

50 25 0 50 Feet

1 inch = 50 feet

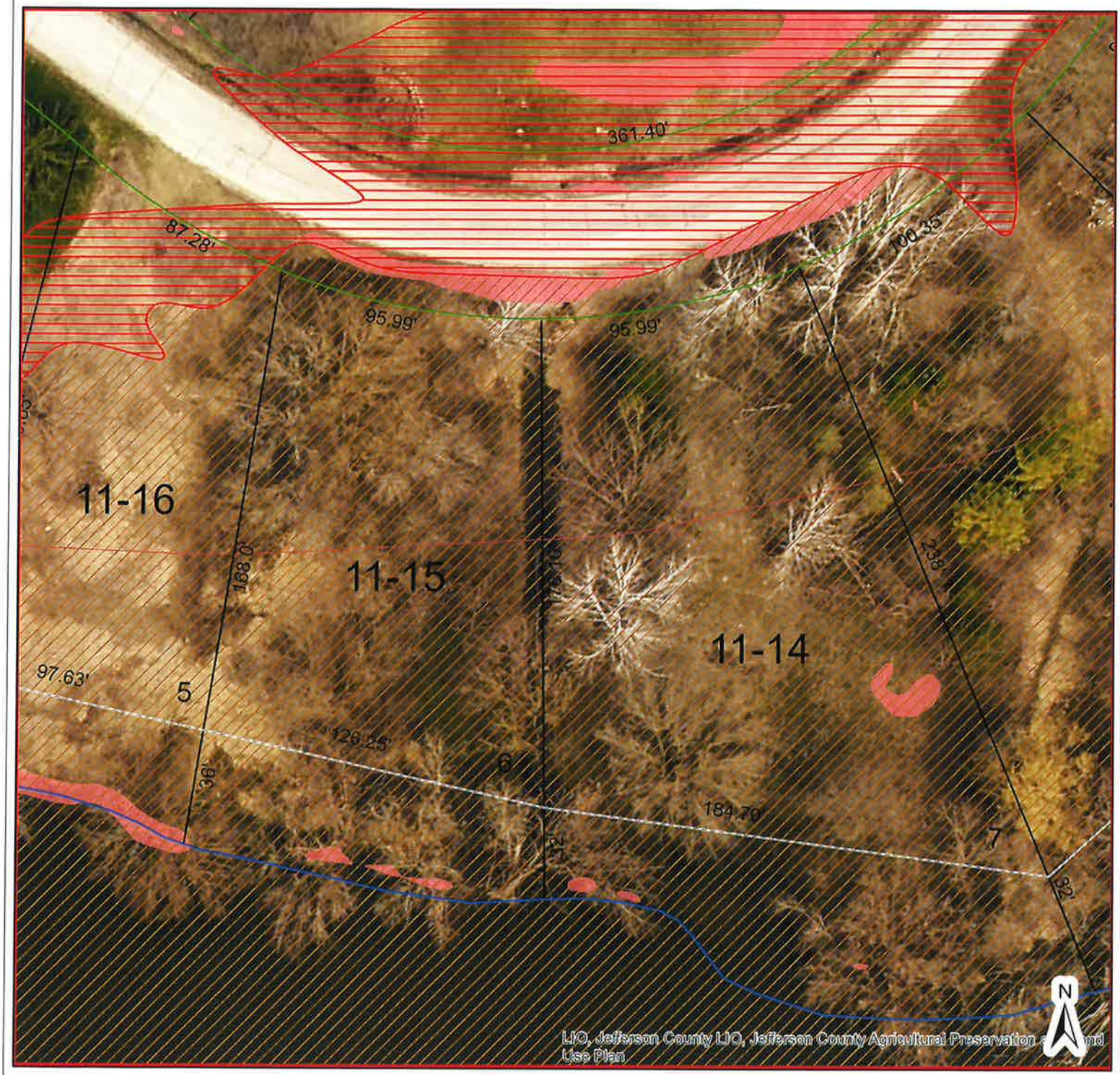
Jefferson County Geographic Information System

Printed on: February 15, 2024

Author: Public User

DISCLAIMER: This map is not a substitute for an actual field survey or onsite investigation. The accuracy of this map is limited to the quality of the records from which it was assembled. Other inherent inaccuracies occur during the compilation process. Jefferson County makes no warranty whatsoever concerning this information.

Jefferson County Land Information



- Municipal Boundaries
- Right of Ways

Parcel Lines

- Property Boundary
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Floodplain 2/4/2015

- ZONE A NO BSE 1%(100 YR)
- ZONE AE BSE 1% (100YR)
- 0.2% FLD HAZ (500 YR)
- Flood Storage Districts 2/4/2015

Slopes > 20% - Terrain Data

- 0 - 20% Slope
- Slope > 20%

- COUNTY ADOPTED
- DNR UPDATED

50 25 0 50 Feet

1 inch = 50 feet

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Wisconsin Department of Safety and Professional Services
Division of Industry Services

SOIL EVALUATION REPORT

in accordance with Comm 85, Wis. Adm. Code

Attach complete site plan on paper not less than 8 1/2 x 11 inches in size. Plan must include, but not limited to: vertical and horizontal reference point (BM), direction and percent slope, scale or dimensions, north arrow, and location and distance to nearest road.

Please print all information.

Personal information you provide may be used for secondary purposes (Privacy Law, s. 15.04 (1) (m)).

County	Jefferson
Parcel I.D.	032-0815-2411-014
Reviewed by	Date

Property Owner	Property Location
Christopher Mueller	Govt. Lot NE 1/4 NE 1/4 S 24 T 08 N R 15 ☒ E ☐ W
Property Owner's Mailing Address: W2844 River Ridge LN	Lot # / Block # / Subd. Name or CSM#
City: Watertown | State: Wi | Zip Code: 53094 | Phone Number: ( )	☐ City ☐ Village ☒ Town: Watertown | Nearest Road: Rock River Paradise

☒ New Construction ☐ Replacement
Use: ☒ Residential / Number of bedrooms ? Code derived design flow rate ? GPD
☐ Public or commercial - Describe:
Parent material: Flood Plain elevation if applicable: ft.

General comments and recommendations:
Area has been filled
No suitable area for drainfield

Boring # 1 ☐ Boring ☒ Pit — Ground surface elev. ____ ft. — Depth to limiting factor 20 in.

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	Roots	Soil Application Rate GPD/ft² *Eff#1	*Eff#2
1	0-13			fill						
2	13-20	7.5 yr 3/1		sil	2fgr	mvfr	as	1f	.6	.8
3			water @ 20"							

Boring # 2 ☐ Boring ☒ Pit — Ground surface elev. ____ ft. — Depth to limiting factor 28 in.

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	Roots	Soil Application Rate GPD/ft² *Eff#1	*Eff#2
1	0-24			fill						
2	24-28	7.5 yr 3/1		sil	2fgr	mvfr	as		.6	.8
3			water @ 28"							

* Effluent #1 = BOD_5 > 30 ≤ 220 mg/L and TSS >30 ≤ 150 mg/L

* Effluent #2 = BOD_5 ≤ 30 mg/L and TSS ≤ 30 mg/L

CST Name (Please Print)	Signature	CST Number
Nicholas A Klein	Nick Klein	1015210
Address	**Date Evaluation Conducted**	**Telephone Number**
N4922 S Farmington Rd Helenville, Wi 53137	2-2-24	

Property Owner Christopher Mueller Parcel ID # 032-0815-2411-014 Page 2 of 3

3 Boring # ☐ Boring ☒ Pit Ground surface elev. _____ ft. Depth to limiting factor _____ in.

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	Roots	Soil Application Rate GPD/ft² *Eff#1	*Eff#2
1	0-24			fill						
2	24-34	7.5yr 3/1		sil	2fgr	mvfr	as		.6	.8
3			Water @ 34"							

☐ Boring # ☐ Boring ☐ Pit Ground surface elev. _____ ft. Depth to limiting factor _____ in.

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	Roots	Soil Application Rate GPD/ft² *Eff#1	*Eff#2

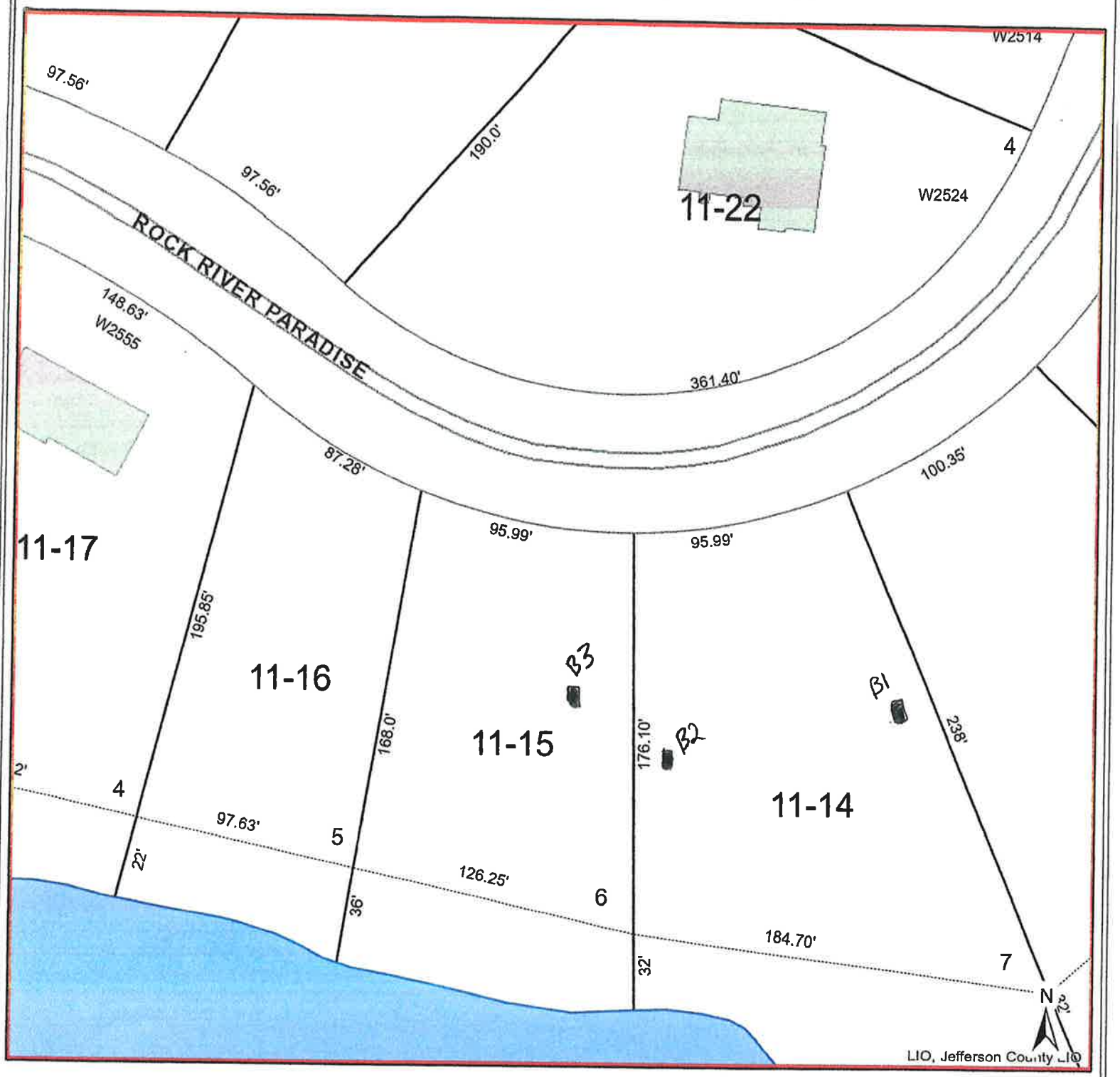
☐ Boring # ☐ Boring ☐ Pit Ground surface elev. _____ ft. Depth to limiting factor _____ in.

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	Roots	Soil Application Rate GPD/ft² *Eff#1	*Eff#2

* Effluent #1 = BOD_5 > 30 ≤ 220 mg/L and TSS >30 ≤ 150 mg/L

* Effluent #2 = BOD_5 ≤ 30 mg/L and TSS ≤ 30 mg/L

Jefferson County Land Information



- Municipal Boundaries
- Road Right of Ways

Parcel Lines

- Property Boundary
- Section Lines
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- Surface Water
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- Map Hooks
- Tax Parcel Information

60 30 0 60 Feet

1 inch = 60 feet

Jefferson County Geographic Information System

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Printed on: February 15, 2024

Author: Public User

February 1, 2024

Jefferson County Planning and Zoning Commission
311 S. Center Avenue, Room C1040
Jefferson, WI 53549

Dear Planning and Zoning Commission Members,

We are requesting your approval of a lot line adjustment between the properties of N3509 W. Cedar Road, Cambridge (Lot 1) and N3620 W. Cedar Road, Cambridge (Lot 2). This is an even exchange of square footage made to account for the present driveway extending beyond the existing lot line of Lot 1.

Previously both properties were owned by Mr. Roger Lehmann, the home at Lot 1 was built in 2013, and the farm (Lot 2) was sold to Mr. Lehmann's grandson, Chris Hebbe, in 2016. With Mr. Lehmann's passing in May of 2023, his oldest daughter, Luann Buchholz, was given the opportunity to purchase the property at Lot 1. Upon surveying to establish the lot lines, it was discovered that the lower part of the driveway and lawn extended onto the farm land. At this time, we asked our surveyor, Dave Riesop, to propose a solution, which is attached to this narrative. Both parties are in agreement with Mr. Riesop's proposal. The diagram on the attached preliminary survey shows the bold line as the proposed solution.

We thank you for your consideration of our request.

Sincerely,

Luann Buchholz

Luann Buchholz

Ron Buchholz

Chris Hebbe

Angel Hebbe

JEFFERSON COUNTY
PRELIMINARY REVIEW FOR CERITFIED SURVEY

A division of land located in the SW 1/4, NE 1/4, of Section 19, Town 6 N, Range 13 E, Town of OAKLAND, Jefferson County, Wisconsin, on parcel Number(s) 022-0613-1913-000

Date Submitted: _____
Revised: _____

Owner: Roger K Lehmann Trust
Address: N3509 W. Cedar Rd.
City, ST Zip: Cambridge, WI 53523
Phone: 920-397-0122

Surveyor: Wisconsin Mapping
Address: 306 West Quarry Street
City, Zip: Deerfield, WI 53531
Phone: 608-764-5602

☑ Rezoning

☐ Allowed Division within an Existing Zoning District

☐ Survey of Existing Parcel

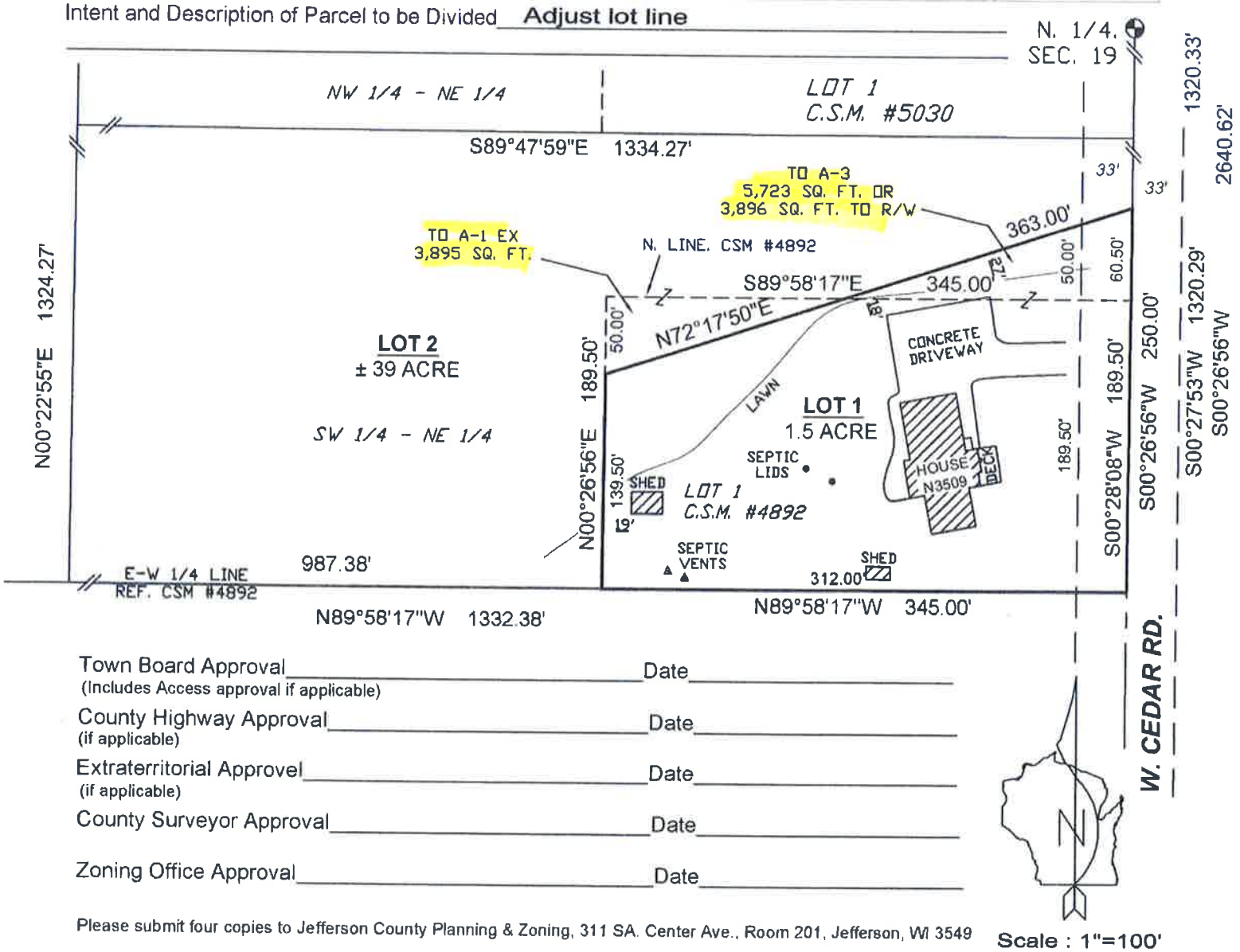
Note to Be Placed on Final CSM:

Petition #_____ Zoning_____
Check for subsequent zoning changes with Jefferson County Planning and Zoning Department

In addition to the info required by Section 236.34 of State Statutes, Sec. 15(f) of the Jefferson County Land Division/Subdivision Ordinance requires that the following be shown:

- Existing buildings, watercourses, drainage ditcheds and
- other features pertinent to the proper division.
- Location of access to a public road, approved by the agency having jurisdiction over the road.
- All lands reserved for future public aquisition.
- Date of the map
- Graphic Scale

Intent and Description of Parcel to be Divided Adjust lot line



Town Board Approval _____ Date _____
(Includes Access approval if applicable)

County Highway Approval _____ Date _____
(if applicable)

Extraterritorial Approvel _____ Date _____
(if applicable)

County Surveyor Approval _____ Date _____

Zoning Office Approval _____ Date _____

Please submit four copies to Jefferson County Planning & Zoning, 311 SA. Center Ave., Room 201, Jefferson, WI 3549

Scale : 1"=100'