

Project Name	BCWD Permit 23-02, Tweden Residence "White Oak Savanna Block 2 Lot 7"	Date	01/08/2024
To / Contact info	Karen Kill / BCWD Administrator		
Cc / Contact info	Jennifer Cates / Cates Fine Homes, Inc.		
Cc / Contact info	Randal Tweden		
From / Contact info	Ryan Fleming, PE / EOR John Sarafolean, EOR		
Regarding	Permit Amendment Engineer's Report		

The following review of an application for a modification of the above-noted permit was conducted to determine compliance with applicable BCWD rules for purposes of the engineer's recommendation to the Board of Managers on the permit application.

Applicant: Randal Tweden

Permit-modification Application Submittal Date: November 27th, 2023

Completeness Determination: November 27th, 2023

Board Action Required By: January 29th, 2024

Review based on BCWD Rules effective April 1, 2020

Recommendation: Consider approval based on the variance analysis herein

BACKGROUND AND GENERAL COMMENTS

The applicant, property owner Randal Tweden, applied for permit 23-02 for construction of a single-family home on Block 2 Lot 7 of the White Oaks Savanna development (7211 Lone Oak Trail in Grant). The application included an erosion control plan that met BCWD Rule 3.0 requirement and construction of a rain garden, consistent with the stormwater-management plan that was a significant component of the basis for approval of White Oak Savanna subdivision permit 17-01, allowing the applicant to benefit from subsection 2.8.1, which provides that a single-family home project that is constructed consistently with a stormwater-management plan implement in accordance with a BCWD permit is exempt from further stormwater-management requirements under BCWD Rule 2.0. In addition, plans submitted were found to be consistent with the 2-foot low-floor from the 100-year high water level of nearby waterbodies freeboard separation requirement in subsection 7.3.2 of the BCWD rules.

As shown in Figure 1, Wetland #7 and the associated wetland buffer cover 2.3 acres of this lot. This area includes the buffer that is protected by a maintenance declaration that was recorded on the property in compliance with Permit 17-01; the buffer area is shown in green. All permit conditions were met prior to construction and the permit is in good standing. Construction of the home and rain garden is complete with only the final landscaping and turf establishment remaining to be completed. The BCWD permit 23-02 is active and the district is currently holding \$19,995 in financial assurance associated with the grading alteration and stormwater facility construction.

The applicant is requesting an amendment to the permit for installation of three ground-mounted solar panels totaling 665 square feet of impervious area southwest of the house in the wetland buffer as shown in Figure 2. The applicant is requesting a variance from compliance with subsection 4.4.2, which prohibits the creation of impervious cover within a wetland buffer.

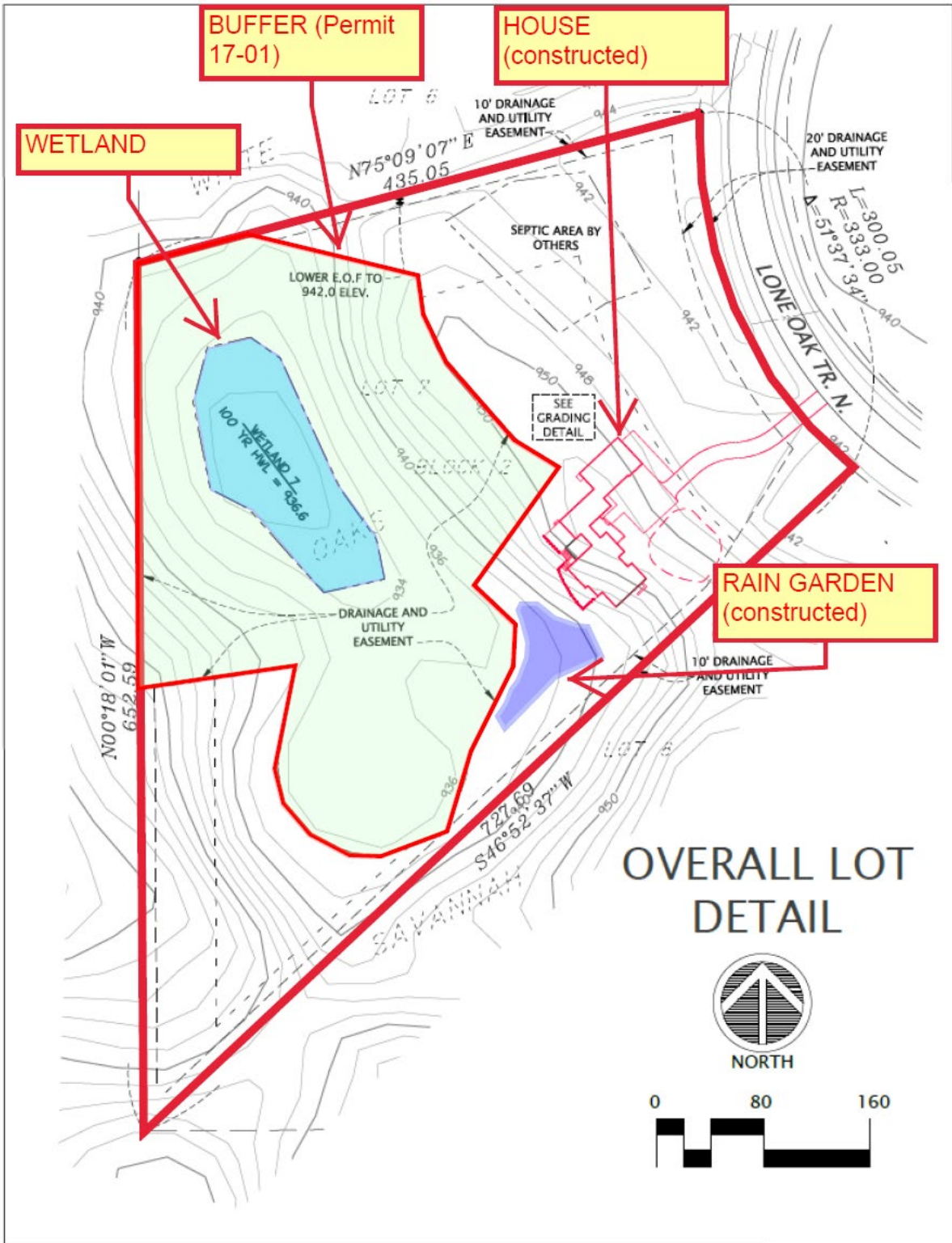


Figure 1: Annotated schematic of Block 2 Lot 7 from Permit 17-01 approved plan

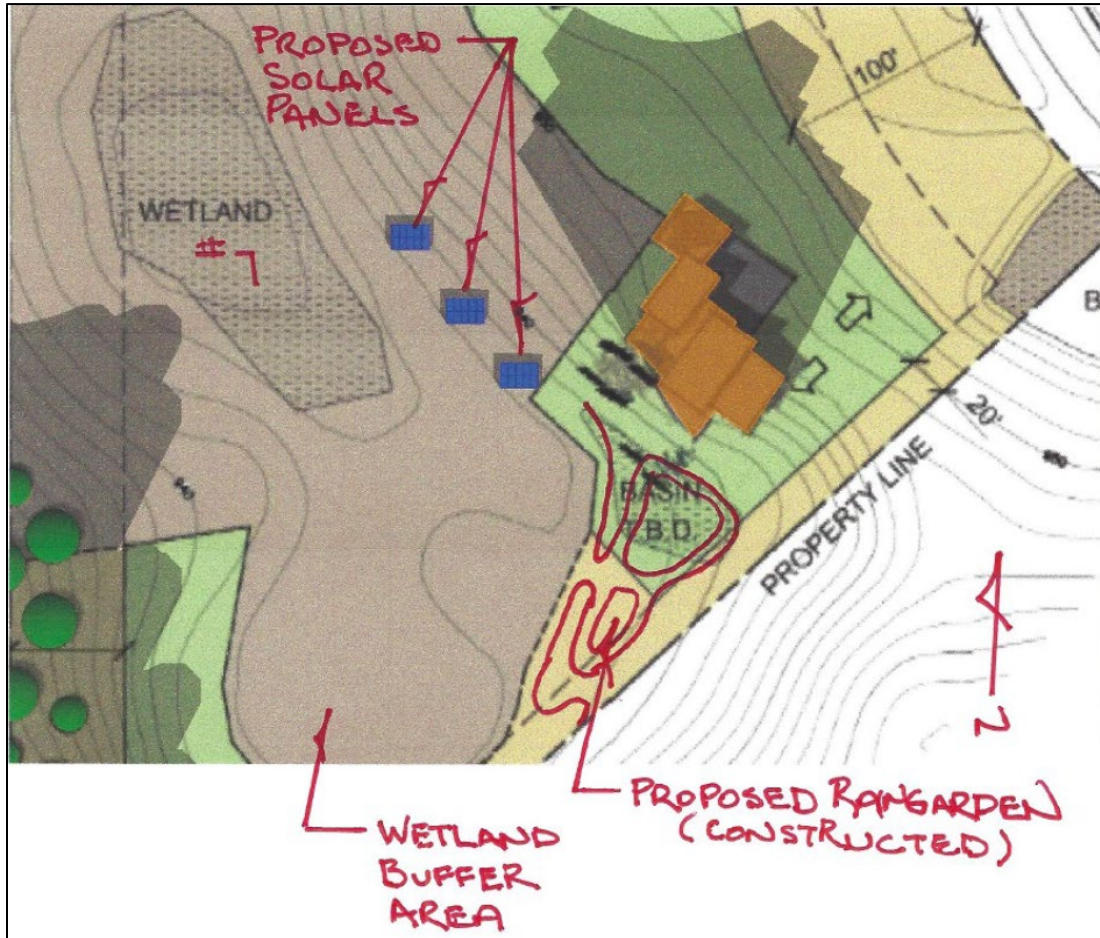


Figure 2: Proposed solar panel layout

Rule 2.0—STORMWATER MANAGEMENT

As noted, plans submitted for the Tweden home construction under application 23-02 were found by the engineer to be consistent with stormwater management approved for the White Oaks Savanna development under BCWD permit 17-01. The 23-02 applicant therefore was exempt from further stormwater-management requirements under subsection 2.8.1 of the BCWD rules.

- Rule Not Applicable to Permit.

Rule 3.0—EROSION CONTROL

According to BCWD Rule 3.2, all persons undertaking any grading, filling, or other land-altering activities which involve movement of more than fifty (50) cubic yards of earth or removal of vegetative cover on five thousand (5,000) square feet or more of land must submit an erosion control plan to the District, and secure a permit from the District approving the erosion control plan.

- Rule requirements met with conditions for the modification.

The installation of the solar panels involves additional disturbance of surface area beyond the home construction, requiring additional erosion- and sediment-control measures discussed below in the

variance section. The applicant must submit an amendment to the erosion- and sediment-control plan that was the basis for approval under the rule for permit 23-02 to address disturbances from the solar-panel installation for the administrator's approval.

Rule 3.0 Conditions:

- 3-1. Submit an amended erosion control site plan for the property including any erosion control and restoration measures needed for the installation of the solar panels. (BCWD 3.2.2).

Rule 4.0—LAKE, STREAM, AND WETLAND BUFFER REQUIREMENTS

The permit for the White Oaks Savanna development (17-01) triggered wetland-buffer requirements, including the delineation and establishment of the buffer area on the Tweden property. BCWD determined that the buffer required by permit 17-01 on the Tweden property had been established as required 07/26/2018. As required by subsection 4.2.2 of the BCWD rules, a maintenance declaration was recorded in the Washington County Recorder's office on the Tweden property June 4, 2018. Section 4.4.2 and the declaration prohibit creation of impervious cover or location of utilities within a wetland buffer. (BCWD Rules 4.4.2(a) and (e).)

- Rule Requirements Not Met - *See Variance Rule 10.0*

The proposed location of the solar panels on the property is within wetland buffer protected by a recorded declaration under permit 17-01. Per the declaration, the proposed activity of installing solar panels is prohibited in the buffer as it does not comply with 4.4.2 subsections a and e of the rule.

Rule 5.0—SHORELINE AND STREAMBANK ALTERATIONS

According to BCWD Rule 5.2, no person may disturb the natural shoreline or streambank partially or wholly below the ordinary high water mark of a waterbody, without first securing a permit from the District.

- Rule Not Applicable to Permit. *There are no proposed shoreline or streambank alterations.*

Rule 6.0—WATERCOURSE AND BASIN CROSSINGS

According to Rule 6.2, no person shall use the beds of any waterbody within the District for the placement of roads, highways and utilities without first securing a permit from the District.

- Rule Not Applicable to Permit. *There are no proposed watercourse or basin crossings.*

Rule 7.0—FLOODPLAIN AND DRAINAGE ALTERATIONS

According to Rule 7.2, no person may alter or fill land below the 100-year flood elevation of any waterbody, wetland, or stormwater management basin, or place fill in a landlocked basin, without first obtaining a permit from the District. No person may alter stormwater flows at a property boundary by changing land contours, diverting or obstructing surface or channel flow, or creating a basin outlet, without first obtaining a permit from the District.

- Rule Not Applicable to Permit. *There are no proposed alterations below the 100-year flood elevation of the wetland. Stormwater flows are not altered at property boundaries.*

Rule 8.0—FEES

Fees for this project as outlined below:

- **TOTAL FEES** **\$0**

Rule 9.0—FINANCIAL ASSURANCES

Financial assurances for this project are as outlined below:

1. Grading or Alteration (0.1 acres disturbed x \$2,000/acre) \$0

- **TOTAL FINANCIAL ASSURANCES**
(\$5,000 Minimum Performance Financial Assurance) **\$0**

**As noted in the Background and General Comments, the District is currently holding \$19,995 in financial assurance associated with the grading alteration and stormwater facility construction.*

Rule 10.0—VARIANCES

According to BCWD Rule 10.0, the Board of Managers may hear requests for variances from the literal provisions of these rules in instances where their strict enforcement would cause undue hardship because of circumstances unique to the property under consideration. The Board of Managers may grant variances where it is demonstrated that such action will be in keeping with the spirit and intent of these rules. Variance approval may be conditioned on an applicant's preventing or mitigating adverse impacts from the activity.

In order to grant a variance, the Board of Managers must determine that the special conditions that apply to the structure or land in question do not apply generally to other land or structures in the District, that the granting of the variance will not merely serve as a convenience to the applicant, and that the variance will not impair or be contrary to the intent of these rules. A hardship cannot be created by the landowner, the landowner's agent or representative, or a contractor, and must be unique to the property. Economic hardship alone is not grounds for issuing a variance.

The Permit Applicant is requesting a variance from compliance with the following requirement, as articulated and applied to the property through the recorded maintenance declaration, for placement of 665 square feet of solar panels within the buffer:

- Rule 4.4.2(a) Wetland Buffers; The following activities are prohibited within a lake or wetland buffer, and within the streamside zone of a stream buffer:
 - (a) Creating impervious cover.
 - (e) Locating roads or utilities, except pursuant to a crossing of the associated watercourse in accordance with section 4.7.

Rule 4.4.2(a) & (e) Limitations in Buffer Zones: Wetland #7 is located on the Tweden Residence at 7211 Lone Oak Trail in Grant. The property is a part of the White Oaks Savanna development and the wetland buffer on the property in review was recorded in the maintenance declaration with the development in 2018. The applicant is proposing to install a solar system consisting of three ground mounted solar panel arrays (groups) on the property within the recorded wetland buffer area. The solar panel groups constitute a utility, and their installation will create 665 square feet of impervious

cover within the 86,792 square foot buffer, which is prohibited by the declaration (BCWD Rule 4.4.2). The panel location is shown in Figure 2, just west of the wetland positioned outside of the 100-yr HWL of the wetland.

The proposed solar panel location was based on findings by solar siting software (HelioScope) submitted by the applicant that the location inside buffer is the most solar efficient location on the property. Other areas on the property, including the roof of the home, were explored but are not proposed due to shading from the mature trees that existed prior to lot development and shading from the house (Figure 3). Other constraints on the lot include the septic drain fields, septic tanks, the drinking water well location, and stormwater facilities along the roadside that were constructed by the developer on both sides of the driveway.



Figure 3: Lot 7 image of mature trees and proposed solar panel location (red oval)

According to the BCWD Rule Statement of Rule Need and Reasonableness (SONAR), wetland buffers serve an important purpose and provide benefit to the natural environment and resources. Buffers surrounding wetlands protect wetlands and serve as riparian areas. Buffer functions and values include water quality protection, hydrologic event modification, ground water interaction, aquatic and terrestrial wildlife habitat, minimization of human impact, and environmental education. Stated in the BCWD Rule SONAR, "For a buffer's greatest long-term effectiveness, sheet flow must be maintained, vegetation must be kept healthy, and incursions from urbanization must be kept to a minimum".

The installation of solar panels in the wetland buffer will have the following impacts: creating concentrated flow of stormwater runoff at the driplines of the solar panels, increased shading underneath the panels, and temporary impacts during installation of the panels. Following is an analysis of the impacts to the buffer functions stated in the SONAR.

Water quality protection – The panels will have negligible impact to the buffer's ability to filter pollutants to protect the wetland. No pollutants will be produced by the solar panels or structural posts

in the buffer and the shading from the panels and the racking posts will not hinder the vegetation from filtering and using the available water for evapotranspiration. Due to the design of the panels sitting on posts off the ground, there will be no disconnection between the vegetation allowing it to function as it would without the panels there.

Hydrologic event modification (Flow rate and volume alteration) – Concentrated flow from the panels will be created where water runs off at the drip line of the panels, however, the area of impact from this flow represents less than 1 percent of the 86,792 square foot buffer area. According to the Minnesota Stormwater Manual Fact Sheet on stormwater guidance for solar farm projects, the MPCA strongly recommends that the lowest vertical clearance of any solar array be no greater than 10 feet in order to prevent/control erosion and scour along the dripline. This recommendation will be followed as the plan calls for the racking to be 6'6" where it meets the middle of the underside of the panel shown in Figure 4. With respect to volume of runoff from the impervious in the buffer, the applicant oversized the rain garden capturing runoff from the house and yard to account for the additional impervious area of the solar panels. While the panels do not drain to the rain garden, the additional capacity in the rain garden will result in more volume retention and pollutant treatment from the home site annually since discharge from the rain garden to the wetland will be less frequent than if the rain garden were to have been sized to just meet the stormwater standard.

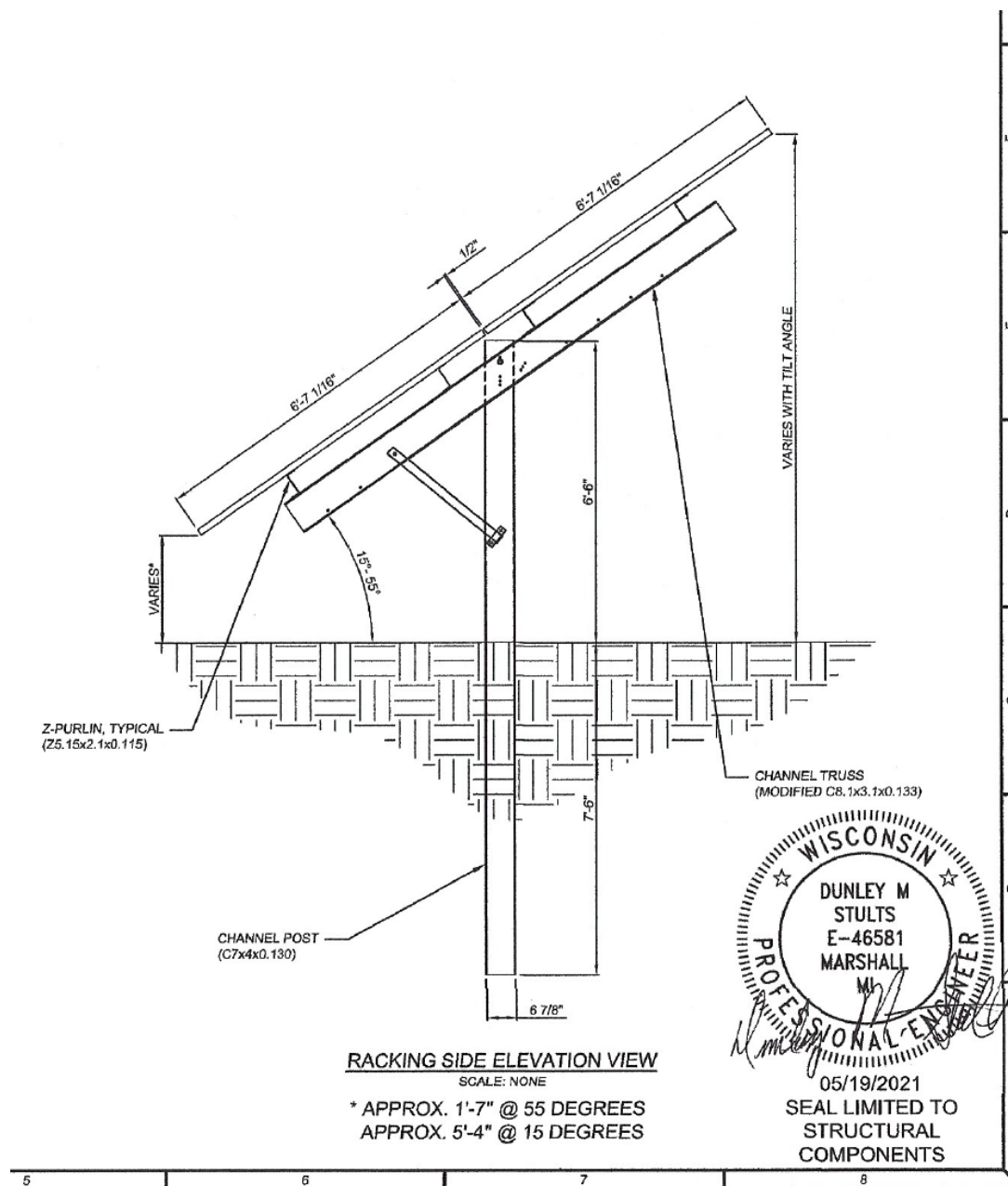


Figure 4: Solar panel design and dimensions.

Aquatic and terrestrial wildlife habitat – The habitat of the buffer vegetation will not be affected by the installation of the solar panels because of the nature of the design. The solar panels are going to be off the ground on posts and will offer an alternative habitat to wildlife such as birds and insects in the shade of the panels and the existing vegetation will remain. Increased shading will not hinder buffer vegetation robustness –a solar study finds that vegetation growth is not hindered and is often helped beneath solar panels (Nordberg, E. J., Julian Caley, M., & Schwarzkopf, L. (2021). Designing solar farms for synergistic commercial and conservation outcomes.). In another finding, the Shell company partnered with groups in the Netherlands to achieve energy transition and climate agreement rules.

The study found that solar parks can be suitable habitat for pollinators and that the average plant coverage, height, and number of species did not differ significantly between the sun and shaded areas. Also, the three sets of panels will be spaced sufficiently allowing for animal passage between panel groups.

Temporary impacts during installation – The posts for the panels to sit upon will be installed using a rubber tracked skid steer with a post driver. This method will cause little to no ground disturbance as there will be no excavation needed for the installation. The applicant will mitigate any disturbances to buffer vegetation during the installation with bio-logs until the vegetation is re-established.

Based on the above analysis, the District Engineer finds that the proposed installation of solar panels in the buffer zone of Wetland #7 will not adversely affect the functions and values of the wetland and is in the spirit and intent of the BCWD rules.

RECOMMENDED CONDITIONS OF THE PERMIT:

The following is a summary of the remaining tasks necessary to bring the project into compliance with the BCWD Rules in all respects other than where variances are requested as discussed above:

1. Address all erosion control requirements (Condition 3-1).

STIPULATIONS OF APPROVAL:

1. Note that the permit, if issued, will require that the applicant notify the District in writing at least three business days prior to commencing land disturbance. (BCWD Rule 3.3.1)