



**Christ The Rock Community Church**

**Conditional Use Permit Application**

**Solar Energy Generating System**

**Narrative and Supporting Information**



## INTRODUCTION

Christ The Rock Community Church, located in the Village of Harrison, Wisconsin, is a Christian congregation dedicated to making disciples of Jesus Christ. Guided by Matthew 4:19, the church's mission emphasizes spiritual formation, compassionate care, and service to others. Through its ministries and programs, Christ The Rock seeks to strengthen individuals, families, and the broader Fox Valley community while serving as a responsible and engaged community institution.



Christ The Rock provides a wide range of programs that support the needs of the surrounding community. These include worship services, children's and youth programs, small groups, and community outreach initiatives, as well as a food pantry serving more than 150 families each week. The church also offers recovery support groups, lay counseling services addressing mental, emotional, and relational needs, and weekly programs for children, youth, and young adults that regularly draw hundreds of participants. On-site amenities such as a café, play areas, and meeting spaces further support families, professionals, and students throughout the week.

Beyond its ministry functions, Christ The Rock Community Church serves as a shared community asset. The facility is regularly used for community events and functions, serves as a polling location for the Village of Harrison, and is utilized by local and county law enforcement for canine training. The property is also used by area fire departments for training and emergency driving practice and is designated as the reunification site for over 65 schools across 7 school districts.

In keeping with its commitment to long-term stewardship, sustainability, and community responsibility, Christ The Rock Community Church is proposing the installation of a solar energy generating system as outlined in this Conditional Use Permit application. The following sections describe the proposed project, its design, location, and measures taken to ensure compatibility with surrounding land uses.

## PROPOSED PROJECT

Christ The Rock Community Church proposes the installation of a 300 kW alternating-current (AC) solar energy generating system, consisting of 702 variable tilt solar panels, on its existing commercial property (parcel 33652) to the west of the church building at W6254 US Highway 10, Harrison, Wisconsin.

The system will support long-term stewardship, sustainability, and responsible facility management and is intended to offset a substantial portion of the church’s energy use while maintaining the property’s current function and character.

The solar installation has been designed to be compatible with surrounding land uses and consistent with the intent of the Village’s conditional use standards. All system components will be located entirely on church-owned property and placed to respect required setbacks, existing site circulation, and operational needs. The layout minimizes visual impact and ensures the continued safe and efficient use of the property for church, community, and public functions.

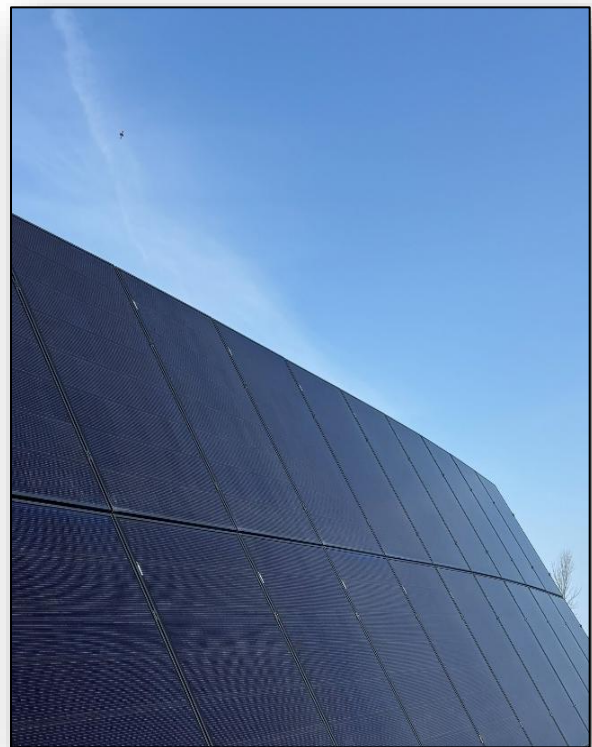
The proposed system will be integrated in an orderly and unobtrusive manner that maintains the visual character of the site. It will not introduce additional noise, lighting, or activity beyond current conditions and will remain secondary to the primary structures and uses of the property. By investing in renewable energy infrastructure, Christ The Rock Community Church seeks to enhance facility sustainability while continuing its role as a community partner and shared civic resource, consistent with local land use objectives and the public interest.

The proposed use is consistent with the intent and purpose of the Village of Harrison Zoning Ordinance and Comprehensive Plan.

## SYSTEM DESIGN

The solar energy generating system consists of four major components: solar panels and racking, power inverters, collection and distribution panels, and grid connections.

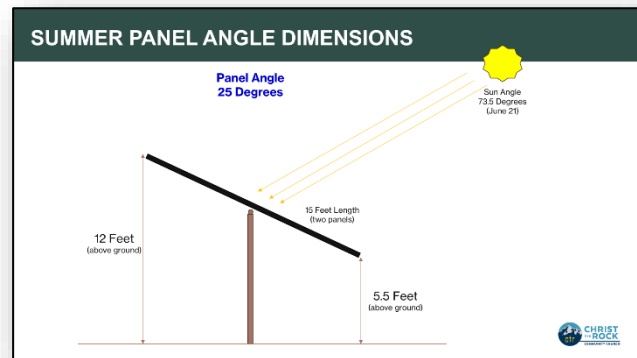
The **solar panels** are made up of photovoltaic cells that absorb sunlight and create direct current (DC) electricity. These panels are approximately 90 inches tall by 45 inches wide, less than 1.5 inch thick, and weigh approximately 62 pounds each. The panels will be installed on a variable tilt racking system that will be manually adjusted seasonally to align them perpendicular to the sun’s rays. The panels selected for this application will produce up to 550 watts, are bifacial monocrystalline, and have a sleek all-black appearance that limits reflectivity and reduces visual contrast.



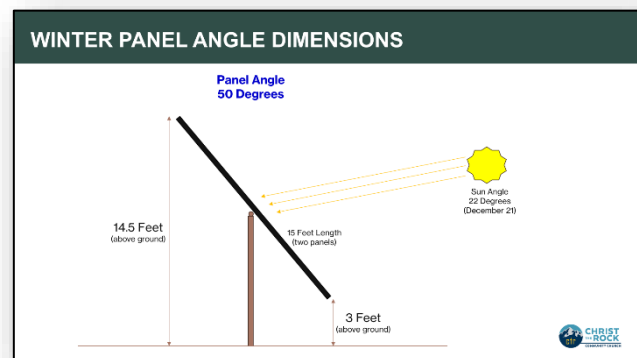


The **solar panel racking system** consists of c-channel posts that are driven into the ground approximately 10–15 feet and extend above the ground by approximately 5 feet. Post depths are determined by geotechnical site assessments and testing of soil characteristics associated with tension, lateral load, compression, and static loads. Concrete foundations will not be required unless post placement is limited by underground obstructions. The panel racking is attached to the posts at a pivot point and with a tilt adjusting mechanism.

During **summer months** the tilt angle of the panels will be approximately 25 degrees (sun angle is 73.5 degrees on June 21); the front of the panel will be approximately 5.5 feet above the ground, and the rear of the panel will be approximately 12 feet above the ground.



During **winter months** the tilt angle will be approximately 50 degrees (sun angle is 22 degrees on December 21); the front of the panel will be approximately 3 feet above the ground, and the rear of the panel will be approximately 14.5 feet above the ground. This steeper angle will capture more of the sun's rays and facilitate snow shedding from the panels.



The **power inverters** convert DC electricity created by the solar panels to alternating current (AC) electricity, which is required for standard building electrical systems and for interconnection with the utility grid. Inverters also regulate voltage and frequency, monitor system performance, and provide automatic safety disconnects if grid conditions are unsafe.

Traditional solar panel systems use large inverters connected to a string of solar panels. These systems can experience reduced output when individual panels are partially shaded or underperforming. The system will use 702 microinverters, one mounted on the back of each panel. Microinverters improve system efficiency and provide panel-by-panel production reporting and detailed analysis.

Each microinverter is rated up to 427 watts. The 702 microinverters and panels are required to achieve the system design of 300 kW AC (702 x 427 = 300,000).

The **collection and distribution panels** are used to collect the AC electricity from the inverters and distribute the electricity to building electrical systems. The collection panels, or “collectors,” will be located near the solar panels in a small weatherproof equipment enclosure. Underground conduits will house the cabling from the solar panel arrays to the enclosure and then from the enclosure to the southeast corner of the existing church building where they will connect with the distribution panels in the basement.

The **grid connection** is necessary for sending excess energy flows to the utility grid through a metered interconnection which will reduce energy usage charges from the utility via a billing arrangement referred to as net metering. Net metering is a crucial component of the agreement with the utility that allows facilities like Christ The Rock to offset electricity usage with electricity production.

## LOCATION ALTERNATIVES

Several factors were considered when determining the best location of the solar panels: future development of the building and property, proximity to entrance of building utilities, cost effectiveness, building functionality, and aesthetic appearance. Several locations were considered: rooftop placement, parking lot carports, parcel to the North of the church building, immediately behind the church building, and in the field to the southwest of the church building.



Approximate Size: 9 inches x 7 inches.

### ***Rooftop Placement***

Installing solar panels on the building roof is a feasible alternative in urban areas when facilities don't have alternative locations; however, it is a costly option with significant drawbacks. Roof-mounted solar panel racking requires penetrating roofing materials to anchor the system to the building structure which would void warranties for the roof and substantially increase costs of future roof repairs and replacement. These penetrations can increase the likelihood of water leaks. Areas of the building with large spans, such as the worship center and lobby, would require additional structural support to carry the system weight. Legal height restrictions of roof-mounted systems limit the angular presentation towards the sun in winter which reduces system effectiveness. This alternative was not selected due to these issues as well as an inability to fit the entire system onto the existing building roof.

### ***Parking Lot Carports***

Parking lot systems (carports) are effective solutions when the facility is looking to provide covered parking spaces and generate solar energy, but they are the most expensive option because of the required engineering, structural steel necessary to address wind loads and snow loads, and they require substantial underground foundations. This alternative is dramatically more expensive than ground-mounted systems. This alternative was not selected due to the substantial additional costs, lack of need for covered parking, and unfavorable aesthetic appearance of towering structures in front of the building.

### ***North of Church Building***

The property to the north of the church (parcel 33600) contains mostly farmland and a curving entrance road to the church property. Installing solar panels at this location is prohibitively expensive due to the distance from the building, inadequate continuous space for grouping solar arrays, shade-generating tree line, water run-off concerns, and the desire for potential future development of this property for residential "senior living" units. This alternative was not selected since the potential future development of this property would better serve interests of the community and the church, and that this location is not a viable cost-effective alternative.

### ***Behind the Church Building***

The space behind the church building currently houses a play area, maintenance building, grass lawn, and farmland. This is prime area for future building expansion considerations. As the congregation size continues to grow, the church leadership will be required to consider possible expansion of the facility with a large addition to the northwest of the existing building as shown in the original construction drawings. This building renovation would require relocation and expansion of play area and parking which may extend into the currently unoccupied spaces. This alternative was not selected so as to not limit future building expansion or development of this portion of the property.

### ***Southwest of the Church Building***

Based on these considerations, the existing field southwest of the church was identified as the preferred location for installation of the solar panels. This location is not impacted by future building expansion or property development, it is on undeveloped land, it preserves open space, it does not interrupt current site functionality, and is near the building for connecting utilities at the southeast corner of the building.

### **APPEARANCE**

Christ The Rock Community Church is making a significant, intentional investment in site aesthetics to ensure the proposed solar energy generating system is visually compatible with surrounding land uses. The church will install a comprehensive planted buffer consisting of a double row of offset Techny Arborvitae (*Thuja occidentalis*), or similar species, along the frontage of the solar panel array. These fast-growing, dense, evergreen shrubs are expected to reach a mature height of approximately 10–15 feet, screening the lower portions of the panels from view with year-round coverage, including during winter months. The buffer will occupy over 45,000 square feet of the property and include nearly 200 arborvitaes, softening the visual impact and remaining consistent with the character of the surrounding area.

Beyond the planted buffer, the solar array will incorporate high-quality, all-black panels to minimize reflectivity and visual contrast. The panels will be arranged in a close, near-continuously connected layout to present a clean and orderly profile. Supplemental landscaping, including native wildflowers and flowering plants integrated into surrounding areas, will provide seasonal visual interest and support pollinators—further demonstrating the church’s commitment to thoughtful site design and environmental stewardship.



## BUILDING CONNECTION

The solar array will be connected to the church building through conductors installed in underground conduit within a trench between the array equipment enclosure and the southeast corner of the building (service entrance). The enclosure will be approximately 8 feet by 8 feet and will be located directly behind the last row of solar panels. It will house the system's electrical equipment—including combiner panels, distribution panels, and disconnect/switchgear—and will serve as the termination point for underground conduits from the solar panel arrays and the origin point for the underground feeder conduit to the building service entrance.



## OPERATIONAL CHARACTERISTICS AND COMMITMENTS

The proposed solar energy generating system will operate as a passive, accessory use to the existing church facility and will not result in changes to site operations or land use intensity. In support of this application, Christ The Rock Community Church commits to the following operational characteristics:

1. No change in hours of operation or site occupancy.  
The solar energy system will operate automatically and will not alter the hours of operation, staffing levels, or occupancy associated with existing church or community uses.
2. No routine on-site staffing required.  
The system will not require daily staffing or supervision. Routine inspection and maintenance activities, if needed, will occur infrequently and during normal daytime hours.
3. No increase in traffic or parking demand.  
Operation of the solar energy system will not generate additional traffic, deliveries, or parking demand beyond existing conditions.
4. No outside storage associated with ongoing operations.  
Except for temporary staging materials during installation or maintenance, the project will not result in ongoing outside storage of materials, equipment, or vehicles.
5. No additional noise, lighting, or visual activity.  
The solar energy generating system will not produce noise, lighting, or activity beyond what currently exists on the property and will remain secondary to the primary church use.
6. Screening and landscaping will be maintained.  
All required landscaping and screening will be installed and maintained in accordance with applicable Village standards to ensure long-term effectiveness of visual buffering.

**FIGURE 1: AERIAL PHOTO**



This photo is from the Calumet County Geographic Information Web Server showing the aerial view for Christ The Rock Community Church and neighboring properties.

**FIGURE 2: ELEVATIONS MAP**



This map is from the Calumet County Geographic Information Web Server showing the land elevations and contour lines for Christ The Rock Community Church and neighboring properties.

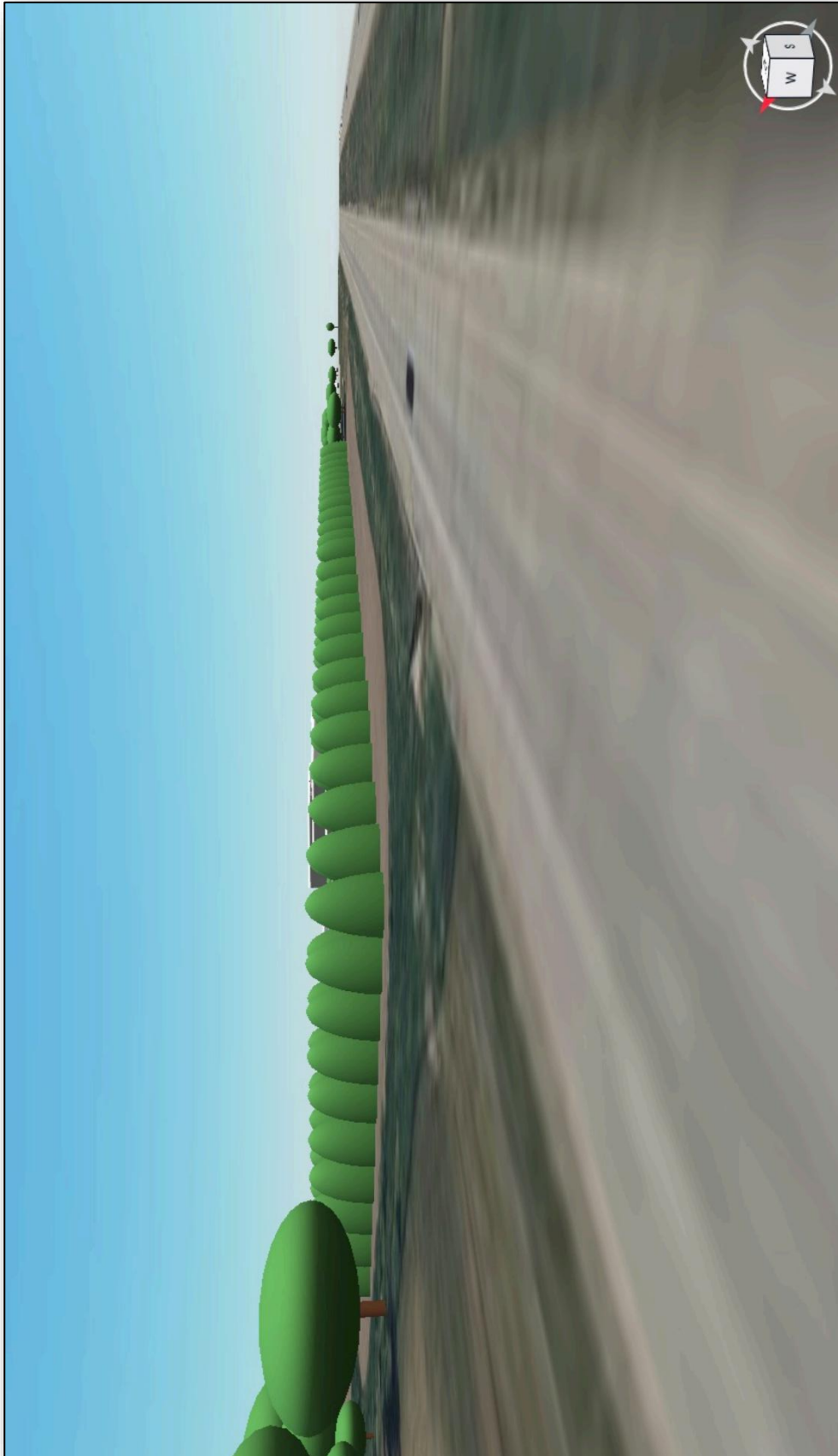
**FIGURE 3: DIMENSIONS FOR SOLAR ARRAY AND PLACEMENT**



This map is from solar design software showing the proposed location of solar panels relative to highway 10 and garage structures on the neighboring property. Image also shows eventual impact of fully grown arborvitae bushes.

The front edge of the first row of solar panels will be located 160' from the centerline of the west lane of highway 10. This location is 50' further north than the garages on the neighboring property.

**FIGURE 4: PREDICTED HIGHWAY VIEW OF SOLAR ARRAY**



This illustration is from solar design software showing the predicted view of the solar array from the southwest when the arborvitae bushes are fully grown.