Appendices

Appendix A

TVA Right-of-Way Clearing Specifications

Tennessee Valley Authority Right-of-Way Clearing Specifications

1. General - The clearing contractor shall review the environmental evaluation documents (categorical exclusion checklist, environmental assessment, or environmental impact statement) for the project or proposed activity, along with all clearing and construction appendices, conditions in applicable general and/or site-specific permits, the storm water pollution prevention plan, and any Tennessee Valley Authority (TVA) commitments to property owners. The contractor shall then plan and carry out operations using techniques consistent with good engineering and management practices as outlined in TVA's *A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Construction and Maintenance Activities (TVA, 2017)*. The contractor will protect areas that are to be left unaffected by access or clearing work at and adjacent to all work sites. In sensitive areas and their buffers, the contractor will retain as much native ground cover and other vegetation as possible.

   If the contractor fails to use BMPs or to follow environmental expectations discussed in the prebid or prework meeting or present in contract specifications, TVA will order corrective changes and additional work as deemed necessary in TVA's judgment to meet the intent of environmental laws and regulations or other guidelines. Major violations or continued minor violations will result in work suspension until correction of the situation is achieved or other remedial action is taken at the contractor's expense. Penalty clauses may be invoked as appropriate.

2. Regulations - The clearing contractor shall comply with all applicable federal, state, and local environmental and antipollution laws, regulations, and ordinances including without limitation all air, water, solid and hazardous waste, noise, and nuisance laws, regulations, and ordinances. The contractor shall secure or ensure that TVA has secured all necessary permits or authorizations to conduct work on the acres shown on the drawings and plan and profile for the contract. The contractor's designated project manager will actively seek to prevent, control, monitor, and safely abate all commonly recognized forms of workplace and environmental pollution. Permits or authorizations and any necessary certifications of trained or licensed employees shall be documented with copies submitted to TVA's right-of-way inspector or construction environmental engineer before work begins. The contractor will be responsible for meeting all conditions specified in permits. Permit conditions shall be reviewed in prework discussions.

3. Land and Landscape Preservation - The clearing contractor shall exercise care to preserve the condition of cleared soils by avoiding as much compacting and deep scarring as possible. As soon as possible after initial disturbance of the soil and in accordance with any permit(s) or other state or local environmental regulatory requirements, cover material shall be placed to prevent erosion and sedimentation of water bodies or conveyances to surface water or groundwater. In areas outside the clearing, use, and access areas, the natural vegetation shall be protected from damage. The contractor and his employees must not deviate from delineated access routes or use areas and must enter the site at designated areas that will be marked. Clearing operations shall be conducted to prevent any unnecessary destruction, scarring, or defacing of the remaining natural vegetation and adjacent surroundings in the vicinity of the work. In sensitive public or environmental areas, appropriate buffer

zones shall be observed and the methods of clearing or reclearing modified to protect the buffer and sensitive area. Some areas may require planting native plants or grasses to meet the criteria of regulatory agencies or commitments to special program interests.

4. Streamside Management Zones - The clearing contractor must leave as many rooted ground cover plants as possible in buffer zones along streams and other bodies of water or wet-weather conveyances thereto. In such streamside management zones (SMZ), tall-growing tree species (trees that would interfere with TVA's National Electrical Safety Code clearances) shall be cut, and the stumps may be treated to prevent resprouting. Low-growing trees identified by TVA as marginal electrical clearance problems may be cut, and then stump treated with growth regulators to allow low, slow-growing canopy development and active root growth. Only approved herbicides shall be used, and herbicide application shall be conducted by certified applicators from TVA's Transmission, Operations, and Maintenance (TOM) organization after initial clearing and construction. Cutting of trees within SMZs must be accomplished by using either hand-held equipment or other appropriate clearing equipment, such as a feller-buncher. The method will be selected based on site-specific conditions and topography to minimize soil disturbance and impacts to the SMZ and surrounding area. Disturbed soils in SMZs must be stabilized by appropriate methods immediately after the right-of-way is cleared. Stabilization must occur within the time frame specified in applicable storm water permits or regulations. Stumps within SMZs may be cut close to the ground but must not be removed or uprooted. Trees, limbs, and debris shall be immediately removed from streams, ditches, and wet areas using methods that will minimize dragging or scarring the banks or stream bottom. No debris will be left in the water or watercourse. Equipment will cross streams, ditches, or wet areas only at locations designated by TVA after the application of appropriate erosion control BMPs consistent with permit conditions or regulatory requirements.

5. Wetlands - In forested wetlands, tall trees will be cut near the ground, leaving stumps and roots in place. The cambium may be treated with herbicides applied by certified applicators from the TOM organization to prevent regrowth. Understory trees that must be initially cut and removed may be allowed to grow back or may be treated with tree growth regulators selectively to slow growth and increase the reclearing cycle. The decision will be situationally made based on existing ground cover, wetland type, and tree species since tall tree removal may "release" understory species and allow them to grow quickly to "electrical clearance problem" heights. In many circumstances, herbicides labeled for water and wetland use may be used in reclearing.

6. Sensitive Area Preservation - If prehistoric or historic artifacts or features that might be of archaeological significance are discovered during clearing or reclearing operations, the activity shall immediately cease within a 100-foot radius, and a TVA right-of-way inspector or construction environmental engineer and the Cultural Resources Program manager shall be notified. The site shall be protected and left as found until a determination about the resources, their significance, and site treatment is made by TVA's Cultural Resources Program. Work may continue beyond the finding zone and the 100-foot radius beyond its perimeter.

7. Water Quality Control - The contractor's clearing and disposal activities shall be performed using BMPs that will prevent erosion and entrance of spillage,

contaminants, debris, and other pollutants or objectionable materials into drainage ways, surface water, or groundwater. Special care shall be exercised in refueling equipment to prevent spills. Fueling areas shall be remote from any sinkhole, crevice, stream, or other water body. Open burning debris will be kept away from streams and ditches and shall be incorporated into the soil.

The clearing contractor will erect and (when TVA or contract construction personnel are unable) maintain BMPs such as silt fences on steep slopes and adjacent to any stream, wetland, or other water body. BMPs will be inspected by the TVA field engineer or other designated TVA or contractor personnel routinely and during periods of high runoff, and any necessary repairs will be made as soon as practicable. BMP inspections will be conducted in accordance with permit requirements. Records of all inspections will be maintained on site, and copies of inspection forms will be forwarded to the TVA construction environmental engineer.

8. Turbidity and Blocking of Streams - If temporary clearing activities must interrupt natural drainage, appropriate drainage facilities and erosion/sediment controls shall be provided to avoid erosion and siltation of streams and other water bodies or water conveyances. Turbidity levels in receiving waters or at storm water discharge points shall be monitored, documented, and reported if required by the applicable permit. Erosion and sediment control measures such as silt fences, water bars, and sediment traps shall be installed as soon as practicable after initial access, site, or right-of-way disturbance in accordance with applicable permit or regulatory requirements.

   Mechanized equipment shall not be operated in flowing water except when approved and, then, only to construct necessary stream crossings under direct guidance of TVA. Construction of stream fords or other crossings will only be permitted at approved locations and to current TVA construction access road standards. Material shall not be deposited in watercourses or within stream bank areas where it could be washed away by high stream flows. Any clearing debris that enters streams or other water bodies shall be removed as soon as possible. Appropriate U.S. Army Corps of Engineers and state permits shall be obtained for stream crossings.

9. Air Quality Control - The clearing or reclearing contractor shall take appropriate actions to limit the amount of air emissions created by clearing and disposal operations to well within the limits of clearing or burning permits and/or forestry or local fire department requirements. All operations must be conducted in a manner that prevents nuisance conditions or damage to adjacent land crops, dwellings, highways, or people.

10. Dust and Mud Control - Clearing activities shall be conducted in a manner that minimizes the creation of fugitive dust. This may require limitations as to type of equipment, allowable speeds, and routes utilized. Control measures such as water, gravel, etc., or similar measures may be used subject to TVA approval. On new construction sites and easements, the last 100 feet before an access road approaches a county road or highway shall be graveled to prevent transfer of mud onto the public road.

11. Burning - The contractor shall obtain applicable permits and approvals to conduct controlled burning. The contractor will comply with all provisions of the permit, notification, or authorization including burning site locations, controlled draft, burning hours, and such other conditions as stipulated. If weather conditions such as wind

speed or wind direction change rapidly, the contractor's burning operation may be temporarily stopped by TVA's field engineer. The debris to be burned shall be kept as clean and dry as possible and stacked and burned in a manner that produces the minimum amount of smoke. Residue from burning will be disposed of according to permit stipulations. No fuel starters or enhancements other than kerosene will be allowed.

12. Smoke and Odors - The contractor will properly store and handle combustible and volatile materials that could create objectionable smoke, odor, or fumes. The contractor shall not burn oil or refuse that includes trash, rags, tires, plastics, or other manufactured debris.

13. Vehicle Exhaust Emissions - The contractor shall maintain and operate equipment in a manner that limits vehicle exhaust emissions. Equipment and vehicles will be kept within the manufacturers' recommended limits and tolerances. Excessive exhaust gases will be eliminated, and inefficient operating procedures will be revised or halted until corrective repairs or adjustments are made.

14. Vehicle Servicing - Routine maintenance of personal vehicles will not be performed on the right-of-way. However, if emergency or "have to" situations arise, minimal/temporary maintenance to personal vehicles will occur in order to mobilize the vehicle to an off-site maintenance shop. Heavy equipment will be serviced on the right-of-way, except in designated sensitive areas. The clearing or reclearing contractor will properly maintain these vehicles with approved spill protection controls and countermeasures. If emergency maintenance in a sensitive or questionable area arises, the area environmental coordinator or construction environmental engineer will be consulted. All wastes and used oils will be properly recovered, handled, and disposed/recycled. Equipment shall not be temporarily stored in stream floodplains, whether overnight or on weekends or holidays.

15. Noise Control - The contractor shall take steps to avoid the creation of excessive sound levels for employees, the public, or the site and adjacent property owners. Concentration of individual noisy pieces as well as the hours and locations of operation should be considered.

16. Noise Suppression - All internal combustion engines shall be properly equipped with mufflers. The equipment and mufflers shall be maintained at peak operating efficiency.

17. Sanitation - A designated representative of TVA or the clearing contractor shall contact a sanitary contractor who will provide sanitary chemical toilets convenient to all principal points of operation for every working party. The facilities shall comply with applicable federal, state, or local health laws and regulations. They shall not be located closer than 100 feet to any stream or tributary or to any wetland. The facilities shall be required to have proper servicing and maintenance, and the waste disposal contractor shall verify in writing that the waste disposal will be in state-approved facilities. Employees shall be notified of sanitation regulations and shall be required to use the toilet facilities.

18. Refuse Disposal - The clearing or reclearing contractor shall be responsible for daily cleanup and proper labeling, storage, and disposal of all refuse and debris on the site produced by his operations and employees. Facilities that meet applicable regulations

and guidelines for refuse collection will be required. Only approved transport, storage, and disposal areas shall be used.

19. Brush and Timber Disposal (Reclearing) - The reclearing contractor shall place felled tree boles in neat stacks at the edge of the right-of-way, with crossing breaks at least every 100 feet. Property owner requests shall be reviewed with the project manager or right-of-way specialist before accepting them. Lop and drop activities must be specified in the contract and on plan and profile drawings with verification with the right-of-way specialist before conducting such work. When tree trimming and chipping is necessary, disposal of the chips on the easement or other locations on the property must be with the consent of the property owner and the approval of the right-of-way specialist. No trees, branches, or chips shall remain in a surface water body or be placed at a location where washing into a surface water or groundwater source might occur.

20. Brush and Timber Disposal (Initial Clearing) - For initial clearing, trees are commonly part of the contractor's contract to remove as they wish. Trees may be removed from the site for lumber or pulpwood or they may be chipped or stacked and burned. All such activities must be coordinated with the TVA field engineer, and the open burning permits, notifications, and regulatory requirements must be met. Trees may be cut and left in place only in areas specified by TVA and approved by appropriate regulatory agencies. These areas may include sensitive wetlands or SMZs where tree removal would cause excessive ground disturbance or in very rugged terrain where windrowed trees are used as sediment barriers along the edge of the right-of-way.

21. Restoration of Site - All disturbed areas, with the exception of farmland under cultivation and any other areas as may be designated by TVA's specifications, shall be stabilized in the following manner unless the property owner and TVA's engineer specify a different method:

    A. The subsoil shall be loosened to a minimum depth of 6 inches if possible and worked to remove unnatural ridges and depressions.

    B. If needed, appropriate soil amendments will be added.

    C. All disturbed areas will initially be seeded with a temporary ground cover such as winter wheat, rye, or millet, depending on the season. Perennials may also be planted during initial seeding if proper growing conditions exist. Final restoration and final seeding will be performed as line construction is completed. Final seeding will consist of permanent perennial grasses such as those outlined in TVA's *A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Construction and Maintenance Activities (TVA, 2017). .* Exceptions would include those areas designated as native grass planting areas. Initial and final restoration will be performed by the clearing contractor.

    D. TVA holds the option, depending upon the time of year and weather condition, to delay or withdraw the requirement of seeding until more favorable planting conditions are certain. In the meantime, other stabilization techniques must be applied.

References

Tennessee Valley Authority. 2017. A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Construction and Maintenance Activities, Revision 3. Edited by G. Behel, S. Benefield, R. Brannon, C. Buttram, G. Dalton, C. Ellis, C. Henley, T. Korth, T. Giles, A. Masters, J. Melton, R. Smith, J.Turk, T. White, R. Wilson. Chattanooga, TN.: Retrieved from <https://www.tva.com/Energy/Transmission-System/Transmission-System-Projects> (n.d.).

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Appendix B

TVA Environmental Quality Protection Specifications for Transmission Line Construction

Tennessee Valley Authority Environmental Quality Protection Specifications for Transmission Line Construction

1. General – Tennessee Valley Authority (TVA) and/or the assigned contractor shall plan, coordinate, and conduct operations in a manner that protects the quality of the environment and complies with TVA's environmental expectations discussed in the preconstruction meeting. This specification contains provisions that shall be considered in all TVA and contract construction operations. If the contractor fails to operate within the intent of these requirements, TVA will direct changes to operating procedures. Continued violation will result in a work suspension until correction or remedial action is taken by the contractor. Penalties and contract termination will be used as appropriate. The costs of complying with the Environmental Quality Protection Specifications are incidental to the contract work, and no additional compensation will be allowed. At all structure and conductor pulling sites, protective measures to prevent erosion will be taken immediately upon the end of each step in a construction sequence, and those protective measures will be inspected and maintained throughout the construction and right-of-way rehabilitation period.

2. Regulations - TVA and/or the assigned contractor shall comply with all applicable federal, state, and local environmental and antipollution laws, regulations, and ordinances related to environmental protection and prevention, control, and abatement of all forms of pollution.

3. Use Areas - TVA and/or the assigned contractor's use areas include but are not limited to site office, shop, maintenance, parking, storage, staging, assembly areas, utility services, and access roads to the use areas. The construction contractor shall submit plans and drawings for their location and development to the TVA engineer and project manager for approval. Secondary containment will be provided for fuel and petroleum product storage pursuant to 29CFR1910.106(D)(6)(iii)(OSHA).

4. Equipment - All major equipment and proposed methods of operation shall be subject to the approval of TVA. The use or operation of heavy equipment in areas outside the right-of-way, access routes, or structure, pole, or tower sites will not be permitted without permission of the TVA inspector or field engineer. Heavy equipment use on steep slopes (greater than 20 percent) and in wet areas will be held to the minimum necessary to construct the transmission line. Steps will be taken to limit ground disturbance caused by heavy equipment usage, and erosion and sediment controls will be instituted on disturbed areas in accordance with state requirements.

   No subsurface ground-disturbing equipment or stump-removal equipment will be used by construction forces except on access roads or at the actual structure, pole, or tower sites, where only footing locations and controlled runoff diversions shall be created that disturb the soil. All other areas of ground cover or in-place stumps and roots shall remain in place. (Note: Tracked vehicles disturb surface layer of the ground due to size and function.) Some disking of the right-of-way may occur for proper seedbed preparation.

   Unless ponding previously occurred (i.e., existing low-lying areas), water should not be allowed to pond on the structure sites except around foundation holes; the water must be directed away from the site in as dispersed a manner as possible. At tower or

structure sites, some means of upslope interruption of potential overland flow and diversion around the footings should be provided as the first step in construction-site preparation. If leveling is necessary, it must be implemented by means that provide for continuous gentle, controlled, overland flow or percolation. A good grass cover, straw, gravel, or other protection of the surface must be maintained. Steps taken to prevent increases in the moisture content of the in-situ soils will be beneficial both during construction and over the service life of any structure.

5. Sanitation - A designated TVA or contractor representative shall contact a sanitary contractor who will provide sanitary chemical toilets convenient to all principal points of operation for every working party. The facilities shall comply with applicable federal, state, or local health laws and regulations. They shall not be located closer than 100 feet to any stream or tributary or to any wetland. The facilities shall be required to have proper servicing and maintenance, and the waste disposal contractor shall verify in writing that the waste disposal will be in state-approved facilities. Employees shall be notified of sanitation regulations and shall be required to use the toilet facilities.

6. Refuse Disposal - Designated TVA and/or contractor personnel shall be responsible for daily inspection, cleanup, and proper labeling, storage, and disposal of all refuse and debris produced by his operations and by his employees. Suitable refuse collecting facilities will be required. Only state-approved disposal areas shall be used. Disposal containers such as dumpsters or roll-off containers shall be obtained from a proper waste disposal contractor. Solid, special, construction/demolition, and hazardous wastes as well as scrap are part of the potential refuse generated and must be properly managed with emphasis on reuse, recycle, or possible give away, as appropriate, before they are handled as waste. Contractors must meet similar provisions on any project contracted by TVA.

7. Landscape Preservation - TVA and its contractors shall exercise care to preserve the natural landscape in the entire construction area as well as use areas, in or outside the right-of-way, and on or adjacent to access roads. Construction operations shall be conducted to prevent any unnecessary destruction, scarring, or defacing of the natural vegetation and surroundings in the vicinity of the work.

8. Sensitive Areas Preservation - Certain areas on site and along the right-of-way may be designated by the specifications or the TVA engineer as environmentally sensitive. These areas include but are not limited to areas classified as erodible, geologically sensitive, scenic, historical and archaeological, fish and wildlife refuges, water supply watersheds, and public recreational areas such as parks and monuments. Contractors and TVA construction crews shall take all necessary actions to avoid adverse impacts to these sensitive areas and their adjacent buffer zones. These actions may include suspension of work or change of operations during periods of rain or heavy public use; hours may be restricted or concentrations of noisy equipment may have to be dispersed. If prehistoric or historic artifacts or features are encountered during clearing or construction operations, the operations shall immediately cease for at least 100 feet in each direction, and TVA's right-of-way inspector or construction superintendent and Cultural Resources Program shall be notified. The site shall be left as found until a significance determination is made. Work may continue elsewhere beyond the 100-foot perimeter.

9. Water Quality Control - TVA and contractor construction activities shall be performed by methods that will prevent entrance or accidental spillage of solid matter, contaminants,

debris, and other objectionable pollutants and wastes into flowing caves, sinkholes, streams, dry watercourses, lakes, ponds, and underground water sources.

The clearing contractor will erect and (when TVA or contract construction personnel are unable) maintain best management practices (BMPs) such as silt fences on steep slopes and adjacent to any stream, wetland, or other water body. Additional BMPs may be required for areas of disturbance created by construction activities. BMPs will be inspected by the TVA field engineer or other designated TVA or contractor personnel routinely and during periods of high runoff, and any necessary repairs will be made as soon as practicable. BMP inspections will be conducted in accordance with permit requirements. Records of all inspections will be maintained on site, and copies of inspection forms will be forwarded to the TVA construction environmental engineer.

Acceptable measures for disposal of waste oil from vehicles and equipment shall be followed. No waste oil shall be disposed of within the right-of-way, on a construction site, or on access roads.

10. Turbidity and Blocking of Streams - Construction activities in or near SMZs or other bodies of water shall be controlled to prevent the water turbidity from exceeding state or local water quality standards for that stream. All conditions of a general storm water permit, aquatic resource alteration permit, or a site-specific permit shall be met including monitoring of turbidity in receiving streams and/or storm water discharges and implementation of appropriate erosion and sediment control measures.

    Appropriate drainage facilities for temporary construction activities interrupting natural site drainage shall be provided to avoid erosion. Watercourses shall not be blocked or diverted unless required by the specifications or the TVA engineer. Diversions shall be made in accordance with TVA's *A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Construction and Maintenance Activities (TVA, 2017).*

    Mechanized equipment shall not be operated in flowing water except when approved and, then, only to construct crossings or to perform required construction under direct guidance of TVA. Construction of stream fords or other crossings will only be permitted at approved locations and to current TVA construction access road standards. Material shall not be deposited in watercourses or within stream bank areas where it could be washed away by high stream flows. Appropriate U.S. Army Corps of Engineers and state permits shall be obtained.

    Wastewater from construction or dewatering operations shall be controlled to prevent excessive erosion or turbidity in a stream, wetland, lake, or pond. Any work or placing of equipment within a flowing or dry watercourse requires the prior approval of TVA.

11. Clearing - No construction activities may clear additional site or right-of-way vegetation or disturb remaining retained vegetation, stumps, or regrowth at locations other than the structure sites and conductor setup areas. TVA and the construction contractor(s) must provide appropriate erosion or sediment controls for areas they have disturbed that have previously been restabilized after clearing operations. Control measures shall be implemented as soon as practicable after disturbance in accordance with applicable federal, state, and/or local storm water regulations.

12. Restoration of Site - All construction disturbed areas, with the exception of farmland under cultivation and any other areas as may be designated by TVA's specifications, shall be stabilized in the following manner unless the property owner and TVA's engineer specify a different method:

    A. The subsoil shall be loosened to a minimum depth of 6 inches if possible and worked to remove unnatural ridges and depressions.

    B. If needed, appropriate soil amendments will be added.

    C. All disturbed areas will initially be seeded with a temporary ground cover such as winter wheat, rye, or millet, depending on the season. Perennials may also be planted during initial seeding if proper growing conditions exist. Final restoration and final seeding will be performed as line construction is completed. Final seeding will consist of permanent perennial grasses such as those outlined in TVA's *A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Construction and Maintenance Activities (TVA, 2017).* Exceptions would include those areas designated as native grass planting areas. Initial and final restoration will be performed by the clearing contractor.

    D. TVA holds the option, depending upon the time of year and weather condition, to delay or withdraw the requirement of seeding until more favorable planting conditions are certain. In the meantime, other stabilization techniques must be applied.

13. Air Quality Control - Construction crews shall take appropriate actions to minimize the amount of air pollution created by their construction operations. All operations must be conducted in a manner that avoids creating a nuisance and prevents damage to lands, crops, dwellings, or persons.

14. Burning - Before conducting any open burning operations, the contractor shall obtain permits or provide notifications as required to state forestry offices and/or local fire departments. Burning operations must comply with the requirements of state and local air pollution control and fire authorities and will only be allowed in approved locations and during appropriate hours and weather conditions. If weather conditions such as wind direction or speed change rapidly, the contractor's burning operations may be temporarily stopped by the TVA field engineer. The debris for burning shall be piled and shall be kept as clean and as dry as possible, then burned in such a manner as to reduce smoke. No materials other than dry wood shall be open burned. The ash and debris shall be buried away from streams or other water sources and shall be in areas coordinated with the property owner.

15. Dust and Mud Control - Construction activities shall be conducted to minimize the creation of dust. This may require limitations as to types of equipment, allowable speeds, and routes utilized. Water, straw, wood chips, dust palliative, gravel, combinations of these, or similar control measures may be used subject to TVA's approval. On new construction sites and easements, the last 100 feet before an access road approaches a county road or highway shall be graveled to prevent transfer of mud onto the public road.

16. Vehicle Exhaust Emissions - TVA and/or the contractors shall maintain and operate equipment to limit vehicle exhaust emissions. Equipment and vehicles that show

excessive emissions of exhaust gasses and particulates due to poor engine adjustments or other inefficient operating conditions shall not be operated until corrective repairs or adjustments are made.

17. Vehicle Servicing - Routine maintenance of personal vehicles will not be performed on the right-of-way. However, if emergency or "have to" situations arise, minimal/temporary maintenance to personal vehicles will occur in order to mobilize the vehicle to an off-site maintenance shop. Heavy equipment will be serviced on the right-of-way except in designated sensitive areas. The Heavy Equipment Department within TVA or the construction contractor will properly maintain these vehicles with approved spill prevention controls and countermeasures. If emergency maintenance in a sensitive or questionable area arises, the area environmental coordinator or construction environmental engineer will be consulted. All wastes and used oils will be properly recovered, handled, and disposed/recycled. Equipment shall not be temporarily stored in stream floodplains, whether overnight or on weekends or holidays.

18. Smoke and Odors - TVA and/or the contractors shall properly store and handle combustible material that could create objectionable smoke, odors, or fumes. The contractor shall not burn refuse such as trash, rags, tires, plastics, or other debris.

19. Noise Control - TVA and/or the contractor shall take measures to avoid the creation of noise levels that are considered nuisances, safety, or health hazards. Critical areas including but not limited to residential areas, parks, public use areas, and some ranching operations will require special considerations. TVA's criteria for determining corrective measures shall be determined by comparing the noise level of the construction operation to the background noise levels. In addition, especially noisy equipment such as helicopters, pile drivers, air hammers, chippers, chain saws, or areas for machine shops, staging, assembly, or blasting may require corrective actions when required by TVA.

20. Noise Suppression - All internal combustion engines shall be properly equipped with mufflers as required by the Department of Labor's *Safety and Health Regulations for Construction*. TVA may require spark arresters in addition to mufflers on some engines. Air compressors and other noisy equipment may require sound-reducing enclosures in some circumstances.

21. Damages - The movement of construction crews and equipment shall be conducted in a manner that causes as little intrusion and damage as possible to crops, orchards, woods, wetlands, and other property features and vegetation. The contractor will be responsible for erosion damage caused by his actions and especially for creating conditions that would threaten the stability of the right-of-way or site soil, the structures, or access to either. When property owners prefer the correction of ground cover condition or soil and subsoil problems themselves, the section of the contract dealing with damages will apply.

References

Tennessee Valley Authority. 2017. A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Construction and Maintenance Activities, Revision 3. Edited by G. Behel, S. Benefield, R. Brannon, C. Buttram, G. Dalton, C. Ellis, C. Henley, T. Korth, T. Giles, A. Masters, J. Melton, R. Smith, J.Turk, T. White, R. Wilson. Chattanooga, TN.: Retrieved from

<https://www.tva.com/Energy/Transmission-System/Transmission-System-Projects> (n.d.).

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Appendix C

TVA Transmission Construction Guidelines near Streams

Tennessee Valley Authority Transmission Construction Guidelines Near Streams

Even the most carefully designed transmission line project eventually will affect one or more creeks, rivers, or other type of water body. These streams and other water areas are protected by state and federal law, generally support some amount of fishing and recreation, and, occasionally, are homes for important and/or endangered species. These habitats occur in the stream and on strips of land along both sides (the streamside management zone [SMZ]) where disturbance of the water, land, or vegetation could have an adverse effect on the water or stream life. The following guidelines have been prepared to help Tennessee Valley Authority (TVA) Transmission Construction staff and their contractors avoid impacts to streams and stream life as they work in and near SMZs. These guidelines expand on information presented in *A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Construction and Maintenance Activities* (TVA, 2017).

Three Levels of Protection

During the preconstruction review of a proposed transmission line, the TVA Environmental Biological Compliance staff will have studied each possible stream impact site and will have identified it as falling into one of three categories: (A) standard streamside management protection, (B) protection of important permanent streams, springs, and sinkholes, or (C) protection of unique habitats. These category designations are based on the variety of species and habitats that exist in the stream, as well as federal requirements to avoid harming certain species.

As early as possible after field surveys are completed by the TVA Biological Compliance Staff, any streams that have been designated as either Category B or C will be discussed with the TVA Environmental Transmission staff. The purpose of these discussions will be to minimize the number of crossings and their impact on the important resources in the streams during design and construction. The category designation for each stream site will then be marked on the transmission line plan and profile sheets. Construction crews are required to protect streams and other identified water habitats using the following pertinent set(s) of guidelines:

(A) Standard Stream Protection

This is the standard (basic) level of protection for streams, springs, sinkholes, and the habitats around them. The purpose of the following guidelines is to minimize the amount and length of disturbance to the water bodies without causing adverse impacts on the construction work.

Guidelines:

1. All construction work around streams, springs, and sinkholes will be done using pertinent best management practices (BMPs) such as those described in *A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Construction and Maintenance Activities,* especially Chapter 5, “Structural Controls Standards and Specifications” (TVA, 2017).

2. All equipment crossings of streams and shorelines must comply with appropriate state permitting requirements. Crossings of all drainage channels, intermittent streams, and permanent streams must be done in ways that avoid erosion problems and long-term changes in water flow. Crossings of any permanent streams must allow for natural movement of fish and other aquatic life.

3. Cutting of trees within SMZs must be accomplished by using either hand-held equipment or other appropriate clearing equipment (e.g., a feller-buncher) that would result in minimal soil disturbance and damage to low-lying vegetation. The method will be selected based on site-specific conditions and topography to minimize soil disturbance and impacts to the SMZ and surrounding area. Stumps can be cut close to ground level, but must not be removed or uprooted.

4. Other vegetation near streams must be disturbed as little as possible during construction. Soil displacement as a result of clearing operations by the actions of plowing, disking, blading, or other tillage or grading equipment will be minimized in SMZs. Shorelines that have to be disturbed must be stabilized as soon as feasible.

(B) Protection of Important Permanent Streams, Springs, and Sinkholes

This category will be used when there is one or more specific reason(s) why a permanent (always-flowing) stream, spring, or sinkhole requires protection beyond that provided by standard BMPs. Reasons for requiring this additional protection include high potential for occupancy by federally listed or significant state-listed species, federally designated critical habitat, or areas designated as special use classification (e.g., trout waters). The purpose of the following guidelines is to minimize the disturbance of the banks and water in the flowing stream(s) where this level of protection is required.

Guidelines:

1. Except as modified by Guidelines 2-4 below, all construction work around streams will be done using pertinent BMPs, such as those described in *A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Construction and Maintenance Activities,* especially Chapter 5, “Structural Controls Standards and Specifications” (TVA, 2017).

2. All equipment crossings of streams must comply with appropriate state (and, at times, federal) permitting requirements. Crossings of drainage channels and intermittent streams must be done in ways that avoid erosion problems and long-term changes in water flow. Category B designations will be discussed with the TVA Environmental Transmission staff as early as possible in the process, to allow time to discuss possible avoidance or minimization of impacts with design and construction.

3. Cutting of trees within SMZs must be accomplished by using either hand-held equipment or other appropriate clearing equipment (e.g., a feller-buncher) that would result in minimal soil disturbance and damage to low-lying vegetation. The method will be selected based on site-specific conditions and topography to minimize soil disturbance and impacts to the SMZ and surrounding area. Cutting of trees near permanent streams must be limited to those required to meet National

Electrical Safety Code and danger tree requirements. Stumps can be cut close to ground level, but must not be removed or uprooted.

4. Other vegetation near streams must be disturbed as little as possible during construction. Soil displacement by the actions of plowing, disking, blading, or other tillage or grading equipment will be minimized in SMZs. Shorelines that have to be disturbed must be stabilized as soon as possible and revegetated as soon as feasible.

(C) Protection of Unique Habitats

This category will be used when, for one or more specific reasons, a temporary or permanent aquatic habitat requires special protection. This relatively uncommon level of protection will be appropriate and required when a unique habitat requiring special protection is present (for example, the spawning area of a rare species), the stream is known to be occupied by a federally listed or significant state-listed species, or when required as a special condition resulting from consultation with the United States Fish and Wildlife Service to avoid project effects on a listed species or designated critical habitat. The purpose of the following guidelines is to avoid or minimize any disturbance of the unique aquatic habitat.

Guidelines:

1. Except as modified by Guidelines 2-4 below, all construction work around the unique habitat will be done using pertinent BMPs, such as those described in *A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Construction and Maintenance Activities,* especially Chapter 5, “Structural Controls Standards and Specifications” (TVA, 2017).

2. Category C designations would be discussed with the TVA Environmental Transmission staff as early as possible following field surveys to allow time to discuss possible avoidance or minimization of impacts with design and construction. Environmental Energy Delivery staff would discuss construction activities to take place in the SMZ with the Environmental Biological Compliance staff. On-site planning sessions would be conducted as needed. All crossings of streams also must comply with appropriate state (and, at times, federal) permitting requirements.

3. Cutting of trees within SMZs must be accomplished by using either hand-held equipment or other appropriate clearing equipment (e.g., a feller-buncher) that would result in minimal soil disturbance and damage to low-lying vegetation. The method will be selected based on site-specific conditions and topography to minimize soil disturbance and impacts to the SMZ and surrounding area. Cutting of trees near permanent streams should be limited to those required to meet National Electrical Safety Code, Federal Energy Regulatory Commission standards, and danger tree requirements. Stumps can be cut close to ground level, but must not be removed or uprooted.

4. Other vegetation near the unique habitat must be disturbed as little as possible during construction. Soil disturbance by plowing, disking, blading, or grading must be kept at a minimum. Areas that have to be disturbed must be stabilized as soon as possible and revegetated as soon as feasible.

5. Special SMZ requirements will be coordinated with Environmental Biological Compliance staff.

Maintenance

During ongoing operations, SMZs will be inspected frequently; and during inactive periods, occasionally. Damaging or failing situations that may cause unacceptable water quality impacts will be corrected as soon as practical.

References

Tennessee Valley Authority. 2017. A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Construction and Maintenance Activities, Revision 3. Edited by G. Behel, S. Benefield, R. Brannon, C. Buttram, G. Dalton, C. Ellis, C. Henley, T. Korth, T. Giles, A. Masters, J. Melton, R. Smith, J.Turk, T. White, R. Wilson. Chattanooga, TN.: Retrieved from <https://www.tva.com/Energy/Transmission-System/Transmission-System-Projects> (n.d.).

Revision July 2017

Comparison of Guidelines Under the Three Stream and Water Body Protection Categories[1] (page 1)

Guidelines	A: Standard Stream Protection	B: Protection of Important Permanent Streams, Springs, and Sinkholes	C: Protection of Unique Habitats
1. Reference	• All TVA construction work around streams, springs, and sinkholes will be done using pertinent Best Management Practices (BMPs) such as those described in *A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Construction and Maintenance Activities*, especially Chapter 5, "Structural Controls Standards and Specifications."	• Except as modified by Guidelines 2-4, all construction work around streams will be done using pertinent BMPs such as those described in *A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Construction and Maintenance Activities*, especially Chapter 5, "Structural Controls Standards and Specifications."	• Except as modified by Guidelines 2-4, all construction work around the unique habitat will be done using pertinent BMPs such as those described in *A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Construction and Maintenance Activities,* especially Chapter 5, "Structural Controls Standards and Specifications."
2. Equipment Crossings	• All equipment crossings of streams and shorelines must comply with appropriate state permitting requirements. • Crossings of all drainage channels, intermittent streams, and permanent streams must be done in ways that avoid erosion problems and long-term changes in water flow. • Crossings of any permanent streams must allow for natural movement of fish and other aquatic life.	• All equipment crossings of streams also must comply with appropriate state (and, at times federal) permitting requirements. • Crossings of drainage channels and intermittent streams must be done in ways that avoid erosion problems and long-term changes in water flow. • All construction activity would be discussed with the TVA Environmental Transmission staff as early as possible in the process to allow time to discuss possible avoidance or minimization of impacts with design and construction.	• All crossings of streams also must comply with appropriate state (and, at times federal) permitting requirements. • All construction activity would be discussed with the TVA Environmental Transmission staff as early as possible following field surveys to allow time to discuss possible avoidance or minimization of impacts with design and construction. • On-site planning sessions would be conducted as needed.

[1]Source: *A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Construction and Maintenance Activities* (TVA, 2017)

Comparison of Guidelines Under the Three Stream and Water Body Protection Categories[1] (page 2)

Guidelines	A: Standard	B: Important Permanent Streams	C: Unique Water Habitats
3. **Cutting Trees**	• Cutting of trees within streamside management zones (SMZs) must be accomplished by using either hand-held equipment or other appropriate clearing equipment (e.g., a feller-buncher) that would result in minimal soil disturbance and damage to low-lying vegetation. The method will be selected based on site-specific conditions and topography to minimize soil disturbance and impacts to the SMZ and surrounding area. • Stumps can be cut close to ground level, but must not be removed or uprooted.	• Cutting of trees within SMZs must be accomplished by using either hand-held equipment or other appropriate clearing equipment (e.g., a feller-buncher) that would result in minimal soil disturbance and damage to low-lying vegetation. The method will be selected based on site-specific conditions and topography to minimize soil disturbance and impacts to the SMZ and surrounding area. • Cutting of trees near permanent streams must be limited to those meeting National Electrical Safety Code (NESC) and danger tree requirements. • Stumps can be cut close to ground level, but must not be removed or uprooted.	• Cutting of trees within SMZs must be accomplished by using either hand-held equipment or other appropriate clearing equipment (e.g., a feller-buncher) that would result in minimal soil disturbance and damage to low-lying vegetation. The method will be selected based on site-specific conditions and topography to minimize soil disturbance and impacts to the SMZ and surrounding area. • Cutting of trees near permanent streams must be limited to those meeting NESC, Federal Energy Regulatory Commission standards, and danger tree requirements. • Stumps can be cut close to ground level, but must not be removed or uprooted.
4. **Other Vegetation**	• Other vegetation near streams must be disturbed as little as possible during construction. • Soil displacement as a result of clearing operations by the actions of plowing, disking, blading, or other tillage or grading equipment will be minimized in SMZs. • Shorelines that have to be disturbed must be stabilized as soon as feasible.	• Other vegetation near streams must be disturbed as little as possible during construction. • Soil displacement by the actions of plowing, disking, blading, or other tillage or grading equipment will be minimized in SMZs. • Shorelines that have to be disturbed must be stabilized as soon as possible and revegetated as soon as feasible.	• Other vegetation near the unique habitat must be disturbed as little as possible during construction. • The soil disturbance by plowing, disking, blading, or grading must be kept at a minimum. • Areas that have to be disturbed must be stabilized as soon as possible and revegetated as soon as feasible. Special SMZ requirements will be coordinated with Environmental Biological Compliance staff.

[1]Source: *A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Construction and Maintenance Activities (TVA, 2017)*

Appendix D

TVA Environmental Quality Protection Specifications for Transmission Substation or Communications Construction

Tennessee Valley Authority Environmental Quality Protection Specifications for Transmission Substation or Communications Construction

1. General – Tennessee Valley Authority (TVA) and/or the assigned contractor and subcontractors shall plan, coordinate, and conduct his or her operations in a manner that protects the quality of the environment and complies with TVA's environmental expectations discussed in the preconstruction meeting (including clearing and grading or reclearing and removal or dismantling). This specification contains provisions that shall be considered in all TVA and contract construction, dismantling, or forensic operations. If the contractor and his or her subcontractors fail to operate within the intent of these requirements, TVA will direct changes to operating procedures. Continued violation will result in a work suspension until correction or remedial action is taken by the contractor. Penalties and contract termination will be used as appropriate. The costs of complying with the Environmental Quality Protection Specifications are incidental to the contract work, and no additional compensation will be allowed. At all site perimeters, structure, foundation, conduit, grounding, fence, drainage ways, etc., appropriate protective measures to prevent erosion or release of contaminants will be taken immediately upon the end of each step in a construction, dismantling, or forensic sequence, and those protective measures will be inspected and maintained throughout the construction and site stabilization and rehabilitation period.

2. Regulations - TVA and/or the assigned contractor and subcontractor(s) shall comply with all applicable federal, state, and local environmental and antipollution laws, regulations, and ordinances related to environmental protection and prevention, control, and abatement of all forms of pollution.

3. Use Areas - TVA and/or the assigned contractor and/or subcontractor(s) use areas include but are not limited to site office, shop, maintenance, parking, storage, staging, assembly areas, utility services, and access roads to the use areas. The construction contractor and subcontractor(s) shall submit plans and drawings for their location and development to the TVA engineer and project manager for approval. Secondary containment will be provided for fuel and petroleum product storage pursuant to 29CFR1910.106(D)(6)(iii)(OSHA).

4. Equipment - All major equipment and proposed methods of operation shall be subject to the approval of TVA. The use or operation of heavy equipment in areas outside the right-of-way, access routes, site, or structure, pole, or tower sites will not be permitted without permission of the TVA inspector or field engineer. Heavy equipment use on steep slopes (greater than 20 percent) and in wet areas will be held to the minimum necessary to construct the transmission or communication facility. Steps will be taken to limit ground disturbance caused by heavy equipment usage, and erosion and sediment controls will be instituted on disturbed areas in accordance with state requirements and best management practices (BMPs).

   No subsurface ground-disturbing equipment or stump-removal equipment will be used by construction forces except on access roads or at the actual site, structure, pole, or tower sites, where only footing locations and controlled runoff diversions shall be created that disturb the soil. All other areas of ground cover or in-place stumps and roots shall remain in place. (Note: Tracked vehicles disturb surface layer of the ground

due to size and function.) Some disking of the right-of-way, access, and site(s) may occur for proper seedbed preparation.

Unless ponding previously occurred (i.e., existing low-lying areas), water should not be allowed to pond on the site or around structures except around foundation holes; the water must be directed away from the site in as dispersed a manner as possible. At tower or structure sites, some means of upslope interruption of potential overland flow and diversion around the footings should be provided as the first step in construction-site preparation. If leveling is necessary, it must be implemented by means that provide for continuous gentle, controlled, overland flow or percolation. A good grass cover, straw, gravel, or other protection of the surface must be maintained. Steps taken to prevent increases in the moisture content of the in-situ soils will be beneficial both during construction and over the service life of any anchor, foundation, or its structure.

5. Sanitation - A designated TVA or contractor and/or subcontractor(s) representative shall contract a sanitary contractor who will provide sanitary chemical toilets convenient to all principal points of operation for every working party. The facilities shall comply with applicable federal, state, or local health laws and regulations. They shall not be located closer than 100 feet to any stream or tributary or to any wetland. The facilities shall be required to have proper servicing and maintenance, and the waste disposal contractor shall verify in writing that the waste disposal will be in state-approved facilities. Employees shall be notified of sanitation regulations and shall be required to use the toilet facilities.

6. Refuse Disposal - Designated TVA and/or contractor and subcontractor(s) personnel shall be responsible for daily inspection, cleanup, and proper labeling, storage, and disposal of all refuse and debris produced by his or her operations and by his or her employees. Suitable refuse collecting facilities will be required. Only state-approved disposal areas shall be used. Disposal containers such as dumpsters or roll-off containers shall be obtained from a proper waste disposal contractor. Solid, special, construction/demolition, and hazardous wastes as well as scrap are part of the potential refuse generated and must be properly managed with emphasis on reuse, recycle, or possible give away, as appropriate, before they are handled as wastes. Records of the amounts generated shall be provided to the site's or project's designated environmental specialist. Contractor(s) and subcontractor(s) must meet similar provisions on any project contracted by TVA. Final debris, refuse, product, and material removal is the responsibility of the contractor unless special written agreement is made with the ultimate TVA owner of the site.

7. Landscape Preservation - TVA and its contractor(s) and subcontractor(s) shall exercise care to preserve the natural landscape in the entire construction, dismantling, or forensic area as well as use areas, in or outside the right-of-way, and on or adjacent to access roads. Construction operations shall be conducted to prevent any unnecessary destruction, scarring, or defacing of the natural vegetation and surroundings in the vicinity of the work.

8. Sensitive Areas Preservation - Certain areas on site and along the access and/or right-of-way may be designated by the specifications or the TVA engineer as environmentally sensitive. These areas include but are not limited to areas classified as erodible, geologically sensitive, scenic, historical and archaeological, fish and wildlife refuges, endangered species' habitat, water supply watersheds, and public recreational areas such as parks and monuments. Contractors, their subcontractor(s), and TVA

construction crews shall take all necessary actions to avoid adverse impacts to these sensitive areas and their adjacent buffer zones. These actions may include suspension of work or change of operations during periods of rain or heavy public use; hours may be restricted or concentrations of noisy equipment may have to be dispersed. If prehistoric or historic artifacts or features are encountered during clearing, grading, borrow, fill, construction, dismantling, or forensic operations, the operations shall immediately cease for at least 100 feet in each direction, and TVA's construction superintendent, project manager, or area environmental program administrator and TVA Cultural Resources Program shall be notified. The site shall be left as found until a significance determination is made. Work may continue elsewhere beyond the 100-foot perimeter.

9. Water Quality Control - TVA and contractor construction, dismantling, or forensic activities shall be performed by methods that will prevent entrance or accidental spillage of solid matter, contaminants, debris, and other objectionable pollutants and wastes into flowing caves, sinkholes, streams, dry watercourses, lakes, ponds, and underground water sources.

   The clearing contractor erected erosion and/or sedimentation control shall be maintained and (when TVA or contract construction personnel are unable) the construction crew(s) shall maintain BMPs such as silt fences on steep slopes and adjacent to any stream, wetland, or other water body. Additional BMPs may be required for areas of disturbance created by construction activities and at sequential steps of construction at the same location on site. BMPs will be inspected by the TVA field engineer or other designated TVA or contractor and/or subcontractor(s) personnel routinely and during periods of high runoff, and any necessary repairs will be made as soon as practicable. BMP inspections and any required sampling will be conducted in accordance with permit requirements. Records of all inspections and sampling results will be maintained on site, and copies of inspection forms and sampling results will be forwarded to the TVA project manager or supporting environmental specialist.

   Acceptable measures for disposal of waste oil from vehicles and equipment shall be followed. No waste oil shall be disposed of within the site, access, or right-of-way, on a related construction site or its access roads.

10. Turbidity and Blocking of Streams - Construction, dismantling, or forensic activities in or near streamside management zones or other bodies of water shall be controlled to prevent the water turbidity from exceeding state or local water quality standards for that stream. **All conditions** of a general storm water permit, aquatic resource alteration permit, or a site-specific permit **shall be met** including monitoring of turbidity in receiving streams and/or storm water discharges and implementation of appropriate erosion and sediment control measures.

    Appropriate drainage facilities for temporary construction, dismantling, or forensic activities interrupting natural site drainage shall be provided to avoid erosion. Watercourses shall not be blocked or diverted unless required by the specifications or the TVA engineer. Diversions shall be made in accordance with TVA's *A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Construction and Maintenance Activities (TVA, 2017).*

    On rights-of-way, mechanized equipment shall not be operated in flowing or standing water bodies except when approved and, then, only to construct crossings or to perform

required construction under direct guidance of TVA. Construction of stream fords or other crossings will only be permitted at approved locations and to current TVA construction access road standards. Material shall not be deposited in watercourses, their adjacent wetlands, or within stream bank areas where it could be washed away by high stream flows. Appropriate U.S. Army Corps of Engineers' and state permits shall be obtained.

Mechanized equipment shall not be operated in flowing or standing water on substation, switching station, or telecommunication sites.

Wastewater from construction, dismantling, or dewatering operations shall be controlled to prevent excessive erosion or turbidity in a stream, wetland, lake, pond or conveyed to a sinkhole. Any work or placing of equipment within a flowing or dry watercourse requires the prior approval of TVA.

11. Floodplain Evaluation - During the planning and design phase of the substation or communications facility, floodplain information should be obtained to avoid locating flood-damageable facilities in the 100-year floodplain. If the preferred site is located within a floodplain area, alternative sites must be evaluated and documentation prepared to support a determination of "no practicable alternative" to siting in the floodplain. In addition, steps taken to minimize adverse floodplain impacts should also be documented.

12. Clearing - No construction, dismantling, or forensic activities may clear additional site or right-of-way vegetation or disturb remaining retained vegetation, stumps, or regrowth at locations other than the structure, substation, or communication site or access thereto. TVA and the construction, dismantling, or forensic contractor(s) must provide appropriate erosion or sediment controls for areas they have disturbed after each disturbance that have previously been restabilized after clearing operations. Control measures shall be implemented as soon as practicable after disturbance in accordance with applicable federal, state, and/or local storm water regulations.

13. Restoration of Site - All construction, dismantling, or forensic-related disturbed areas with the exception of farmland under cultivation and any other areas as may be designated by TVA's specifications shall be stabilized in the following manner unless the property owner and TVA's engineer specify a different method:

    A. The subsoil shall be loosened to a minimum depth of 6 inches if possible and worked to remove unnatural ridges and depressions.

    B. If needed, appropriate soil amendments will be added.

    C. All disturbed areas will initially be seeded with a temporary ground cover such as winter wheat, rye, or millet, depending on the season. Perennials may also be planted during initial seeding if proper growing conditions exist. Final restoration and final seeding will be performed as line construction is completed. Final seeding will consist of permanent perennial grasses such as those outlined in TVA's *A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Construction and Maintenance Activities (TVA, 2017).* Exceptions would include those areas designated as native grass planting areas. Initial and final restoration will be performed by the clearing contractor.

D. Rehabilitation species shall use species designated by federal guidance that are low–maintenance, native species appropriate for the site conditions that prevail at that location.

E. TVA holds the option, depending upon the time of year and weather condition, to delay or withdraw the requirement of seeding until more favorable planting conditions are certain. In the meantime, other stabilization techniques must be applied.

F. The site must be protected from species designated by the federal Invasive Species Council and must not be the source of species that can be transported to other locations via equipment contaminated with viable materials; thus, the equipment must be inspected, and any such species' material found must be removed and destroyed prior to transport to another location.

14. Air Quality Control - Construction, dismantling, and/or forensic crews shall take appropriate actions to minimize the amount of air pollution created by their operations. All operations must be conducted in a manner that avoids creating a nuisance and prevents damage to lands, crops, dwellings, or persons.

15. Burning - Before conducting any open burning operations, the contractor and subcontractor(s) shall obtain permits or provide notifications as required to state forestry offices and/or local fire departments. Burning operations must comply with the requirements of state and local air pollution control and fire authorities and will only be allowed in approved locations and during appropriate hours and weather conditions. If weather conditions such as wind direction or speed change rapidly, the contractor's burning operations may be temporarily stopped by the TVA field engineer. The debris for burning shall be piled and shall be kept as clean and as dry as possible, then burned in such a manner as to reduce smoke. No materials other than dry wood shall be open burned. The ash and debris shall be buried away from streams or other water sources and shall be in areas coordinated with the property owner on rights-of-way or project manager for TVA sites.

16. RENOVATION OR DEMOLITION DEBRIS MAY NOT BE BURNED.

17. Dust and Mud Control - Construction, dismantling, or forensic activities shall be conducted to minimize the creation of dust. This may require limitations as to types of equipment, allowable speeds, and routes utilized. Water, straw, wood chips, dust palliative, gravel, combinations of these, or similar control measures may be used subject to TVA's approval. On new construction sites and easements, the last 100 feet before an access road approaches a county road or highway shall be graveled to prevent transfer of mud onto the public road.

18. Vehicle Exhaust Emissions - TVA and/or the contractor(s) and subcontractor(s) shall maintain and operate equipment to limit vehicle exhaust emissions. Equipment and vehicles that show excessive emissions of exhaust gasses and particulates due to poor engine adjustments or other inefficient operating conditions shall not be operated until corrective repairs or adjustments are made.

19. Vehicle Servicing - Routine maintenance of personal vehicles will not be performed on the right-of-way or access route to the site. However, if emergency or "have to" situations arise, minimal/temporary maintenance to personal vehicles will occur in order

to mobilize the vehicle to an off-site maintenance shop. Heavy equipment will be serviced on the site except adjacent to or in designated sensitive areas. The Heavy Equipment Department within TVA or the construction, dismantling, or forensic contractor will properly maintain these vehicles with approved spill protection controls and countermeasures. If emergency maintenance in a sensitive or questionable area arises, the area environmental coordinator or construction environmental engineer will be consulted. All wastes and used oils will be properly recovered, handled, and disposed/recycled. Records of amounts generated shall be provided to TVA. Equipment shall not be temporarily stored in stream floodplains whether overnight or on weekends or holidays.

20. Smoke and Odors - TVA and/or the contractor(s) and subcontractor(s) shall properly store and handle combustible material that could create objectionable smoke, odors, or fumes. The contractor and subcontractor(s) shall not burn refuse such as trash, rags, tires, plastics, or other debris.

21. Noise Control - TVA and/or the contractor and subcontractor(s) shall take measures to avoid the creation of noise levels that are considered nuisances, safety, or health hazards. Critical areas including but not limited to residential areas, parks, public use areas, and some ranching operations will require special considerations. TVA's criteria for determining corrective measures shall be determined by comparing the noise level of the construction, dismantling, or forensic operation to the background noise levels. In addition, especially noisy equipment such as helicopters, pile drivers, air hammers, chippers, chain saws, or areas for machine shops, staging, assembly, or blasting may require corrective actions when required by TVA.

22. Noise Suppression - All internal combustion engines shall be properly equipped with mufflers as required by the Department of Labor's *Safety and Health Regulations for Construction.* TVA may require spark arresters in addition to mufflers on some engines. Air compressors and other noisy equipment may require sound-reducing enclosures in some circumstances.

23. Damages - The movement of construction, dismantling, or forensic crews and equipment shall be conducted in a manner that causes as little intrusion and damage as possible to crops, orchards, woods, wetlands, and other property features and vegetation. The contractor and subcontractor(s) will be responsible for erosion damage caused by his or her actions and employees and, especially, for creating conditions that would threaten the stability of the right-of-way or site soil, the structures, or access to either. When property owners prefer the correction of ground cover condition or soil and subsoil problems themselves, the section of the project to be handled shall be documented with an implementation schedule and a property owner signature obtained.

24. Final Site Cleanup and Inspection - The contractor’s designated person shall ensure that all construction, dismantling, or forensic-related debris, products, materials, and wastes are properly handled, labeled as required, and removed from the site. Upon completion of those activities, that person and a TVA-designated person shall walk down the site and complete an approval inspection.

References

Tennessee Valley Authority. 2017. A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Construction and Maintenance

Activities, Revision 3. Edited by G. Behel, S. Benefield, R. Brannon, C. Buttram, G. Dalton, C. Ellis, C. Henley, T. Korth, T. Giles, A. Masters, J. Melton, R. Smith, J.Turk, T. White, R. Wilson. Chattanooga, TN.: Retrieved from <https://www.tva.com/Energy/Transmission-System/Transmission-System-Projects> (n.d.).

Revision July 2017

Appendix E

TVA Right-of-Way Vegetation Management Guidelines

Energy Delivery Environmental Protection Procedures
Right-Of-Way Vegetation Management Guidelines

1.0 Overview

A. The Tennessee Valley Authority (TVA) must manage the vegetation on its rights-of-way and easements to ensure emergency maintenance access and routine access to structures, switches, conductors, and communications equipment. In addition, TVA must maintain adequate clearance, as specified by the National Electrical Safety Code, between conductors and tall growing vegetation and other objects. This requirement applies to vegetation within the right-of-way as well as to trees located off the right-of-way.

B. Each year TVA assesses the conditions of the vegetation on and along its rights-of-way. This is accomplished by aerial inspections, periodic field inspections, aerial photography, and information from TVA personnel, property owners and the general public. Important information gathered during these assessments includes the coverage by various vegetation types, the mix of plant species, the observed growth, the seasonal growing conditions, and the density of the tall vegetation. TVA also evaluates the proximity, height, and growth rate of trees adjacent to the right-of-way that may be a danger to the line or structures.

C. TVA right-of-way specialists develop a vegetation re-clearing plan that is specific to each line segment and is based on terrain conditions, species mix, growth, and density.

2.0 Right-of-Way Management Methods

A. TVA uses an integrated vegetation management approach. In farming areas, TVA encourages property owner management of the right-of-way using low growing crops. In dissected terrain with rolling hills and interspersed woodlands, TVA may utilize mechanical mowing.

B. TVA uses a variety of herbicides specific to the species present with a variety of possible application techniques. TVA utilizes control methods, including use of low volume herbicide applications, occasional single tree injections, and tree growth regulators (TGRs) to a large extent.

C. In very steep terrain, in sensitive environmental areas, in extensive wetlands, at stream banks, and in sensitive property owner land use areas, hand clearing may be utilized. Hand clearing is recognized as one of the most hazardous occupations documented by the Occupational Health and Safety Administration. For that reason, TVA utilizes low volume herbicide applications in these areas when feasible.

D. TVA does not encourage tree re-clearing by individual property owners because of the high hazard potential of hand clearing, possible interruptions of the line, and electrical safety considerations for untrained personnel that might do the work. Private property owners may re-clear the right-of-way with trained re-clearing professionals.

E. Mechanical mowers not only cut the tall saplings and seedlings on the right-of-way, they also shatter the stump and the supporting near surface root crown. The tendency of resistant species is to re-sprout from the root crown and shattered stumps can produce a multi-stem dense stand in the immediate area. Repeated use of mowers on short cycle re-clearing with many original stumps re-growing in the above manner can create a single species thicket or monoculture. With the original large root system and multiple stems, the resistant species can produce re-growth at the rate of 5-10 feet in a year. In years with high rainfall, the growth can reach 12-15 feet in a single year. These dense, monoculture stands can become nearly impenetrable for even large tractors. Such stands have low diversity, little wildlife food or nesting potential, and become a property owner concern. Selective herbicide application may be used to control monoculture stands.

F. TVA encourages property owners to sign an agreement to manage rights-of-way on their land for wildlife under the auspices of "Project Habitat," a joint project by TVA, BASF, and wildlife organizations, e.g., National Wild Turkey Federation, Quail Unlimited, and Buckmasters. The property owner maintains the right-of-way in wildlife food and cover with emphasis on quail, turkey, deer or other wildlife. A variation used in or adjacent to developing suburban areas is to sign agreements with the developer and residents to plant and maintain wildflowers on the right-of-way.

G. TVA places strong emphasis on managing rights-of-way in the above manner. When the property owners do not agree to these opportunities, TVA must maintain the right-of-way in the most environmentally acceptable, cost-effective, and efficient manner possible.

3.0 Herbicide Program

A. TVA has worked with universities (such as Mississippi State University, University of Tennessee, Purdue University and others), chemical manufacturers, other utilities, U.S. Department of Transportation, U.S. Fish and Wildlife (USFWS), and U.S. Forest Service (USFS) personnel to explore options for vegetation control. The results have been strong recommendations to use species-specific, low volume herbicide applications in more situations. Research, demonstrations, and other right-of-way programs show a definite improvement of rights-of-way treated with selective low-volume applications of new herbicides using a variety of application techniques and timing. Table 1 below identifies herbicides currently used on TVA rights-of-way. Table 2 identifies pre-emergent herbicides currently being used on bare ground areas on TVA rights-of-way and in substations. Table 3 identifies TGRs that may be used on tall trees that have special circumstances that require trimming on a regular cycle, e.g., restrictions on complete removal. The rates of application utilized are those listed on the U.S. Environmental

Protection Agency (USEPA) approved label and consistent with utility standard practice throughout the Southeast.

Table 1 - Herbicides Currently Used on TVA Rights-of-Way

Trade Name	Active Ingredient	Label Signal Word
Accord/Accord XRT II	Glyphosate/Liquid	Caution
Arsenal	Imazapyr/Liquid/Granule	Caution
Chopper	Imazapyr/RTU	Caution
Clearstand	Imazapyr/Metsulfuron Methyl/Liquid	Caution
Escort	Metsulfuron Methyl/Dry Flowable	Caution
Garlon	Triclopyr/Liquid	Caution
Garlon 3A	Triclopyr/Liquid	Danger
Habitat	Imazapyr/Liquid	Caution
Krenite S	Fosamine Ammoinium	Caution
Milestone VM	Aminopyralid/Liquid	Caution
Pathfinder II	Triclopyr/RTU	Caution
Rodeo	Glyphosate/Liquid	Caution
Roundup	Glyphosate/Liquid	Caution
Roundup Pro	Glyphosate	Caution
Streamline	Aminocyclopyrachlor/ Metsulfuron Methyl/Liquid	Caution
Transline	Clopyralid/Liquid	Caution
Viewpoint	Imazapyr/Aminocyclopyrachlor/ Metsulfuron Methyl/Liquid	Caution

Table 2 - Pre-Emergent Herbicides Currently Used for Bare Ground Areas On TVA Rights-of-Way

Trade Name	Active Ingredients	Label Signal Word
Arsenal 5G	Imazapyr/Granule	Caution
Sahara	Diuron/Imazapyr	Caution
SpraKil SK-26	Tebuthiuron/Diuron/Granules	Caution
SpraKil S-5	Tebuthiuron/Granules	Caution
Topsite	Diuron/Imazapyr	Caution

Table 3 - Tree Growth Regulators (TGRs) Currently Used On TVA Rights-of-Way

Trade Name	Active Ingredients	Label Signal Word
Profile 2SC	TGR-paclobutrazol	Caution
TGR	Flurprimidol	Caution

B. The herbicides listed in Table 1 and 2 and TGRs listed in Table 3 have been evaluated in extensive studies in support of registration applications and label requirements. Many have been reviewed in the USFS vegetation management environmental impact statements (EISs), and those evaluations are incorporated here by reference (USFS 1989a, 1989b, 2002a, and 2002b). Electronic copies can be accessed at http://www.fs.fed.us/r8/planning/documents/vegmgmt/. The result of these reviews has been a consistent finding of limited environmental impact beyond that of control of the target vegetation. All the listed herbicides have been found to be of low environmental toxicity when applied by trained applicators following the label and registration procedures, including prescribed measures, such as buffer zones, to protect threatened and endangered species.

C. Low volume herbicide applications are recommended since research demonstrates much wider plant diversity after such applications. There is better ground erosion protection and more wildlife food plants and cover plants develop. In most situations there is increased development of wild flowering plants and shrubs. In conjunction with herbicides, the diversity and density of low-growing plants provide control of tall-growing species through competition.

D. Wildlife managers often request the use of herbicides in place of rotary mowing in order to avoid damage to nesting and tunneling wildlife. This method retains ground cover year around with a better mix of food species and associated high-protein insect populations for birds in the right seasons. Most also report less damage to soils (even when compared with rubber-tired equipment).

E. Property owners interested in tree production often request the use of low volume applications rather than hand or mechanical clearing because of the insect and fungus problems in damaged vegetation and debris left on the right-of-way. The insect and fungus invasions, such as pine tip moth, oak leaf blight, sycamore and dogwood blight, etc., are becoming widespread across the nation.

F. Best Management Practices (BMPs) governing application of herbicides are contained within *A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Transmission Construction and Maintenance Activities* (Muncy 2012) which is incorporated by reference. Herbicides can be liquid, granular, or powder and can be applied aerially or by ground equipment and may be selectively applied or broadcast, depending on the site requirements, species present, and condition of the vegetation. Water quality considerations include measures taken to keep herbicides from reaching streams whether by direct application or through runoff of or

flooding by surface water. "Applicators" must be trained, licensed, and follow manufacturers' label instructions, USEPA guidelines, and respective state regulations and laws.

G. When herbicides are used, their potential adverse impacts are considered in selecting the compound, formulation, and application method. Herbicides that are designated "Restricted Use" by USEPA require application by or under the supervision of applicators certified by the respective state control board. Aerial and ground applications are done either by TVA or by contractors in accordance with the following guidelines identified in the TVA BMP manual (Muncy 2012):

1. The sites to be treated are selected and application directed by the appropriate TVA official.
2. A preflight walking or flying inspection is made within 72 hours prior to applying herbicides aerially. This inspection ensures that no land use changes have occurred, that sensitive areas are clearly identified to the pilot, and that buffer zones are maintained.
3. Aerial application of liquid herbicides will normally not be made when surface wind speeds exceed 5 miles per hour, in areas of fog, or during periods of temperature inversion.
4. Pellet application will normally not be made when the surface wind speeds exceed 10 miles per hour, or on frozen or water saturated soils.
5. Liquid application is not performed when the temperature reaches 95 degrees Fahrenheit or above.
6. Application during unstable, unpredictable, or changing weather patterns is avoided.
7. Equipment and techniques are used that are designed to ensure maximum control of the spray swath with minimum drift.
8. Herbicides are not applied to surface water or wetlands unless specifically labeled for aquatic use. Filter and buffer strips will conform at least to federal and state regulations and any label requirements. The use of aerial or broadcast application of herbicides is not allowed within a streamside management zone (SMZ) adjacent to perennial streams, ponds, and other water sources. Hand application of certain herbicides labeled for use within SMZs is used only selectively.
9. Buffers and filter strips (200 feet minimum width) are maintained next to agricultural crops, gardens, farm animals, orchards, apiaries, horticultural crops, and other valuable vegetation.
10. Herbicides are not applied in the following areas or times: (a) in city, state, and national parks or forests or other special areas without written permission and/or required permits (b) off the right-of-way and (c) during rainy periods or during the 48- hour interval prior to rainfall predicted with a 20 percent or greater probability by local forecasters, when soil active herbicides are used.

H. TVA currently uses primarily low volume applications of foliar and basal applications, e.g., Accord (Glyphosate), Arsenal (Imazapyr), Clearstand (Imazapyr / Metsulfuron

Methyl), Milestone VM (Aminopyralid) and Streamline (Aminocyclopyrachlor / Metsulfuron Methyl).

4.0 References

Muncy, J. A. 2012. A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Transmission Construction and Maintenance Activities (revised edition). Edited by Abigail Bowen, Jodie Branum, Corey Chandler, Adam Dattilo, Britta Dimick, Shea Gaither, Casey Henley, Todd Liskey, Joe Melton, Cherie Minghini, Paul Pearman, Kenton Smithson, Joe Turk, Emily Willard, Robby Wilson. Norris: TVA Technical Note TVA/LR/NRM 92/1. Retrieved from <http://www.tva.com/power/projects/bmp_manual_2012.pdf> (n.d.).

U.S. Forest Service. 1989a. Vegetation Management in the Coastal Plain/Piedmont Final Environmental Impact Statement, Volumes I and II. Southern Region Management Bulletin R8-MB-23, January 1989. Atlanta, Ga.: USDA Forest Service.

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———. 2002b. Vegetation Management in the Coastal Plain/Piedmont Final Environmental Impact Statement Supplement. Southern Region Management Bulletin R8-MB-98A, October 2002. Atlanta, Ga.: USDA Forest Service.

Appendix F

Correspondence and Supporting Information

U.S. Department of Agriculture

FARMLAND CONVERSION IMPACT RATING

PART I *(To be completed by Federal Agency)*	Date Of Land Evaluation Request
Name of Project Yum Yum Solar Site	Federal Agency Involved Tennessee Valley Authority
Proposed Land Use Solar array	County and State Fayette, TN
PART II *(To be completed by NRCS)*	Date Request Received By NRCS / Person Completing Form:

Does the site contain Prime, Unique, Statewide or Local Important Farmland? *(If no, the FPPA does not apply - do not complete additional parts of this form)*	YES ☑ NO ☐	Acres Irrigated 288	Average Farm Size 307
Major Crop(s) Hay	Farmable Land In Govt. Jurisdiction Acres: 0 %	Amount of Farmland As Defined in FPPA Acres: 1511 % 35	
Name of Land Evaluation System Used NRCS 658.5(a)	Name of State or Local Site Assessment System	Date Land Evaluation Returned by NRCS	

PART III *(To be completed by Federal Agency)*	Alternative Site Rating Site A	Site B	Site C	Site D
A. Total Acres To Be Converted Directly	1624			
B. Total Acres To Be Converted Indirectly	0			
C. Total Acres In Site	2639			
PART IV *(To be completed by NRCS)* Land Evaluation Information				
A. Total Acres Prime And Unique Farmland	1511			
B. Total Acres Statewide Important or Local Important Farmland	0			
C. Percentage Of Farmland in County Or Local Govt. Unit To Be Converted	0			
D. Percentage Of Farmland in Govt. Jurisdiction With Same Or Higher Relative Value	0			
PART V (To be completed by NRCS) Land Evaluation Criterion Relative Value of Farmland To Be Converted (Scale of 0 to 100 Points)	66			

PART VI *(To be completed by Federal Agency)* Site Assessment Criteria *(Criteria are explained in 7 CFR 658.5 b. For Corridor project use form NRCS-CPA-106)*	**Maximum Points**	Site A	Site B	Site C	Site D
1. Area In Non-urban Use	(15)	15			
2. Perimeter In Non-urban Use	(10)	10			
3. Percent Of Site Being Farmed	(20)	16			
4. Protection Provided By State and Local Government	(20)	0			
5. Distance From Urban Built-up Area	(15)	15			
6. Distance To Urban Support Services	(15)	10			
7. Size Of Present Farm Unit Compared To Average	(10)	10			
8. Creation Of Non-farmable Farmland	(10)	3			
9. Availability Of Farm Support Services	(5)	3			
10. On-Farm Investments	(20)	8			
11. Effects Of Conversion On Farm Support Services	(10)	2			
12. Compatibility With Existing Agricultural Use	(10)	0			
TOTAL SITE ASSESSMENT POINTS	160	92	0	0	0
PART VII ***(To be completed by Federal Agency)***					
Relative Value Of Farmland *(From Part V)*	100	66	0	0	0
Total Site Assessment *(From Part VI above or local site assessment)*	160	92	0	0	0
TOTAL POINTS ***(Total of above 2 lines)***	260	158	0	0	0

Site Selected:	Date Of Selection	Was A Local Site Assessment Used? YES ☐ NO ☑

Reason For Selection:

Name of Federal agency representative completing this form: Jason McMaster | Date: 7/8/2019

(See Instructions on reverse side) **Form AD-1006 (03-02)**

STEPS IN THE PROCESSING THE FARMLAND AND CONVERSION IMPACT RATING FORM

Step 1 - Federal agencies (or Federally funded projects) involved in proposed projects that may convert farmland, as defined in the Farmland Protection Policy Act (FPPA) to nonagricultural uses, will initially complete Parts I and III of the form. For Corridor type projects, the Federal agency shall use form NRCS-CPA-106 in place of form AD-1006. The Land Evaluation and Site Assessment (LESA) process may also be accessed by visiting the FPPA website, http://fppa.nrcs.usda.gov/lesa/.

Step 2 - Originator (Federal Agency) will send one original copy of the form together with appropriate scaled maps indicating location(s)of project site(s), to the Natural Resources Conservation Service (NRCS) local Field Office or USDA Service Center and retain a copy for their files. (NRCS has offices in most counties in the U.S. The USDA Office Information Locator may be found at http://offices.usda.gov/scripts/ndISAPI.dll/oip_public/USA_map, or the offices can usually be found in the Phone Book under U.S. Government, Department of Agriculture. A list of field offices is available from the NRCS State Conservationist and State Office in each State.)

Step 3 - NRCS will, within 10 working days after receipt of the completed form, make a determination as to whether the site(s) of the proposed project contains prime, unique, statewide or local important farmland. (When a site visit or land evaluation system design is needed, NRCS will respond within 30 working days.

Step 4 - For sites where farmland covered by the FPPA will be converted by the proposed project, NRCS will complete Parts II, IV and V of the form.

Step 5 - NRCS will return the original copy of the form to the Federal agency involved in the project, and retain a file copy for NRCS records.

Step 6 - The Federal agency involved in the proposed project will complete Parts VI and VII of the form and return the form with the final selected site to the servicing NRCS office.

Step 7 - The Federal agency providing financial or technical assistance to the proposed project will make a determination as to whether the proposed conversion is consistent with the FPPA.

INSTRUCTIONS FOR COMPLETING THE FARMLAND CONVERSION IMPACT RATING FORM

(For Federal Agency)

Part I: When completing the "County and State" questions, list all the local governments that are responsible for local land use controls where site(s) are to be evaluated.

Part III: When completing item B (Total Acres To Be Converted Indirectly), include the following:

1. Acres not being directly converted but that would no longer be capable of being farmed after the conversion, because the conversion would restrict access to them or other major change in the ability to use the land for agriculture.
2. Acres planned to receive services from an infrastructure project as indicated in the project justification (e.g. highways, utilities planned build out capacity) that will cause a direct conversion.

Part VI: Do not complete Part VI using the standard format if a State or Local site assessment is used. With local and NRCS assistance, use the local Land Evaluation and Site Assessment (LESA).

1. Assign the maximum points for each site assessment criterion as shown in § 658.5(b) of CFR. In cases of corridor-type project such as transportation, power line and flood control, criteria #5 and #6 will not apply and will, be weighted zero, however, criterion #8 will be weighed a maximum of 25 points and criterion #11 a maximum of 25 points.

2. Federal agencies may assign relative weights among the 12 site assessment criteria other than those shown on the FPPA rule after submitting individual agency FPPA policy for review and comment to NRCS. In all cases where other weights are assigned, relative adjustments must be made to maintain the maximum total points at 160. For project sites where the total points equal or exceed 160, consider alternative actions, as appropriate, that could reduce adverse impacts (e.g. Alternative Sites, Modifications or Mitigation).

Part VII: In computing the "Total Site Assessment Points" where a State or local site assessment is used and the total maximum number of points is other than 160, convert the site assessment points to a base of 160.
Example: if the Site Assessment maximum is 200 points, and the alternative Site "A" is rated 180 points:

$$\frac{\text{Total points assigned Site A}}{\text{Maximum points possible}} = \frac{180}{200} \text{ X } 160 = 144 \text{ points for Site A}$$

For assistance in completing this form or FPPA process, contact the local NRCS Field Office or USDA Service Center.

NRCS employees, consult the FPPA Manual and/or policy for additional instructions to complete the AD-1006 form.

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Example: if the Site Assessment maximum is 200 points, and the alternative Site "A" is rated 180 points:

$$\frac{\text{Total points assigned Site A}}{\text{Maximum points possible}} = \frac{180}{200} \text{ X } 160 = 144 \text{ points for Site A}$$

For assistance in completing this form or FPPA process, contact the local NRCS Field Office or USDA Service Center.

NRCS employees, consult the FPPA Manual and/or policy for additional instructions to complete the AD-1006 form.

June 21, 2019

U.S. Army Corps of Engineers
USACE Memphis District
167 N. Main Street
Building 202, Room 520
Memphis, TN 38103

Subject: **Yum Yum Solar Project**
Preliminary Jurisdictional Determination Verification Request
Yum Yum, Fayette County, Tennessee

To Whom It May Concern:

Yum Yum Solar LLC (Yum Yum Solar), a subsidiary of Invenergy Solar Development North America LLC (Invenergy) intends to develop a site in Fayette County, Tennessee as a photovoltaic (PV) solar power generating facility. The proposed Yum Yum Solar project area ("Project Area") would occupy portions of 25 individual tracts, which in their entirety encompass nearly 2,876 contiguous acres in rural Fayette County, Tennessee, southwest of the unincorporated community of Yum Yum (Appendix A, Figures 1 and 2). On behalf of its subsidiary Yum Yum Solar, Invenergy has authorized HDR Engineering, Inc. (HDR) as its agent to submit the enclosed Preliminary Jurisdictional Determination (PJD) request for written verification from the U.S. Army Corps of Engineers (USACE) regarding the extent of jurisdictional features within the Project Area.

Applicant Name: Yum Yum Solar LLC; POC: Ms. Ariel Kondiles
Mailing Address: One South Wacker Drive, Suite 1800, Chicago, IL 60606
Phone Number of Owner/Applicant: 312-638-8508
Project Location: both sides of Stanton Road, north of Highway 59 in Fayette County, TN
Basin: Loosahatchie River (Hydrologic Unit Code [HUC] 08010209)
City: Yum Yum
County: Fayette County
Center Decimal Degree Coordinates of Project Area: 35.3261°, -89.4046°
USGS Quadrangle Name: Lambert, TN and Laconin, TN (1997)

Project Area Description and Desktop Analysis

Invenergy has secured rights from the owners of 25 individual parcels to construct the proposed solar facility on their properties. Existing landowner and parcel information is summarized in Appendix B and depicted on Figure 3 (Appendix A). Land use within the Project Area consists of primarily of agricultural land with forested field margins and drainageways.

The Project Area is located in the Laurel Creek Canal sub-watershed (12-digit Hydrologic Unit Code [HUC] 080102090401), Little Cypress Creek Canal sub-watershed (HUC 12 -080102090402), and Big Muddy Creek Upper sub-watershed (HUC 12-080102080401) in the Loosahatchie Watershed (HUC-8 08010209) (Appendix A, Figure 4). The Laurel Creek Canal drains southeast from the Project Area to its confluence with the Loosahatchie River approximately six miles southeast of the Project Area.

The U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) provides wetlands data and analysis available to the public. A review of the USFWS NWI indicated the potential presence of wetlands located within the Project Area (Appendix A, Figure 5A – 5B). The U.S. Geological Survey (USGS) National Hydrography Dataset (NHD) provides digital geospatial datasets to the public that map a network of surface waters and catchments of the U.S. A review of the USGS NHD also depicts a number of stream channels within the Project Area (Appendix A, Figure 5A – 5B).

According to the Natural Resources Conservation Services (NRCS) Soils of Fayette County (Figure 6A – 6B, Appendix A), on-site soils consist of 46 soils mail units, which are summarized in Table 1 (Appendix C). The NRCS's National Hydric Soils List classifies Henry silt loam (He), Henry silt loam, terrace (HeT), and Wavery silt loam (Wv) as hydric for Fayette County (NRCS 2019b). Soil map units and corresponding hydric ratings are included in Figure 6 (Appendix A).

Jurisdictional Delineation

On November 11-16, 2018 and January 13-18 and March 12-13, 2019, HDR environmental scientists Kelly Thames, Professional Wetland Scientist (PWS), Tennessee Qualified Hydrologic Professional in Training (TN-QHP-IT), Mike Swenson, and Katy Leuth reviewed the Project Area for waters of the U.S. under Section 404 of the Clean Water Act (CWA). Potentially jurisdictional waters of the U.S. were delineated according to the methodology and guidance described in the U.S. Army Corps of Engineers (USACE) 1987 Wetland Delineation Manual, USACE Post-Rapanos guidance, and the 2012 USACE Atlantic and Gulf Coastal Plain Regional Supplement (Version 2.0). Streams were classified utilizing the methodology and guidance provided in Regulatory Guidance Letter (RGL) 05-05 and the Tennessee Department of Environment and Conservation (TDEC) Division of Water Pollution Control Guidance for Making Hydrologic Determinations (Version 1.4). Potentially jurisdictional waters of the U.S. were mapped using a Trimble® Geo7X GPS unit capable of sub-meter accuracy. GPS points were post-processed utilizing Trimble® GPS Pathfinder Office software.

Results

The results of the on-site field investigation conducted by HDR indicate that there are 24 wetlands (43.81 acres), 15 open water ponds (11.32 acres), 16 perennial streams (35,982 linear feet), and 39 intermittent streams (31,197 linear feet) located within the Project Area (Appendix A, Figure 7). A summary of potentially jurisdictional waters within the Project Area is provided in Table 1 (below).

Table 1. Summary of On-Site Waters

Type of Water	Flow Regime	Length (linear feet)	Area (acres)
Streams	Perennial	35,982	--
	Intermittent	31,197	--
Open Water Ponds	--	--	11.32
Wetlands	--	--	43.81
	Total:	**67,179 lf**	**55.13 ac.**

Non-Wetland Waters

On-site non-wetland waters total approximately 67,179 linear feet of potentially jurisdictional stream channel and 11.32 acres of impounded open water ponds. A summary of on-site non-wetland waters is provided in Appendix D (Tables 1 and 2) and representative photographs are provided in Appendix F.

Wetland Waters

There are 24 potentially jurisdictional wetlands located within the Project Area, consisting of a mix of forested and shrub/scrub wetlands. On-site wetland waters total approximately 43.81 acres. A summary of on-site wetland waters is provided in Appendix D (Table 3). Wetland Determination Data Forms representative of on-site wetlands are provided in Appendix E and representative photographs are provided in Appendix F.

On behalf of Yum Yum Solar, HDR is hereby requesting a PJD for the potentially jurisdictional waters of the U.S. identified within the Project Area. Should you have any questions or require additional information following your review of the enclosed materials, please contact Kelly Thames at (704) 338-6710 or kelly.thames@hdrinc.com.

Sincerely,

Kelly Thames

Kelly Thames, PWS, TN-QHP-IT
Environmental Scientist

Thomas Blackwell, PWS
Project Manager

Attachments:
Preliminary Jurisdictional Determination Form
Appendix A – Figures
Appendix B – Property Owner Information
Appendix C – On-Site Soils
Appendix D – Potentially Jurisdictional Waters
Appendix E – USACE Wetland Determination Data Forms
Appendix F – Representative Site Photographs

cc: John Aquilino, Invenergy, LLC

References

Cowardin, L.M., Carter, V., Golet, F.C., and LaRoe, E.T. 1979. Classification of Wetlands and Deepwater Habitats of the United States. U.S. Fish and Wildlife Service, Washington, D.C.Environmental Laboratory. 1987. Corps of Engineers Wetlands Delineation Manual. U.S. Army Engineer Waterways Experiment Station, Vicksburg, Miss. Technical Report Y-87-1. 207 p.

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_____. 1987. Wetland Delineation Manual. Vicksburg, MS.

U.S. Fish and Wildlife Service. 2017. National Wetlands Inventory. October 2017. Online [URL]: (https://www.fws.gov/wetlands/) (Accessed: May 2019).

U.S. Geological Survey (USGS). 2017. National Hydrography Dataset. Online [URL]: (http://nhd.usgs.gov/) (Accessed: May 2019).

PRELIMINARY JURISDICTIONAL DETERMINATION FORM

This preliminary JD finds that there *"may be"* waters of the United States on the subject project site, and identifies all aquatic features on the site that could be affected by the proposed activity, based on the following information:

District Office: Memphis District | File/ORM #: | PJD Date: May 30, 2019

State: TN | City/County: Yum Yum/Fayette

Nearest Waterbody: Laurel Creek Canal (Loosahatchie River 08010209)

Location: TRS, LatLong or UTM: 35.3261°, -89.4046°

Name/ Address of Person Requesting PJD: Kelly Thames, PWS, TN-QHP-IT
Environmental Scientist
HDR
440 S. Church Street, Suite 1000
Charlotte, NC 28202-2075

Identify (Estimate) Amount of Waters in the Review Area:

Non-Wetland Waters: 67,179 linear ft | 4 width | 17.5 acres | Stream Flow: Perennial

Wetlands: 43.81 acre(s) | Cowardin Class: Palustrine, forested and Palustrine, scrub shrub

Name of Any Water Bodies on the Site Identified as Section 10 Waters: Tidal: | Non-Tidal:

☐ Office (Desk) Determination
☑ Field Determination: | Date of Field Trip: March 13, 2019

SUPPORTING DATA: Data reviewed for preliminary JD (check all that apply - checked items should be included in case file and, where checked and requested, appropriately reference sources below):

- ☑ Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant: Yum Yum Solar, LLC
- ☑ Data sheets prepared/submitted by or on behalf of the applicant/consultant.
  - ☐ Office concurs with data sheets/delineation report.
  - ☐ Office does not concur with data sheets/delineation report.
- ☐ Data sheets prepared by the Corps
- ☐ Corps navigable waters' study:
- ☑ U.S. Geological Survey Hydrologic Atlas:
  - ☐ USGS NHD data.
  - ☑ USGS 8 and 12 digit HUC maps.
- ☑ U.S. Geological Survey map(s). Cite quad name: Lambert and Laconin, TN
- ☑ USDA Natural Resources Conservation Service Soil Survey. Citation: NCRS Soils Survey of FayetteCounty
- ☑ National wetlands inventory map(s). Cite name: USFWS NWI (2017)
- ☐ State/Local wetland inventory map(s):
- ☐ FEMA/FIRM maps:
- ☐ 100-year Floodplain Elevation is:
- ☑ Photographs: ☐ Aerial (Name & Date): ☑ Other (Name & Date): Field photos (Nov 2018, Jan 2019, March 2019)
- ☐ Previous determination(s). File no. and date of response letter:
- ☐ Other information (please specify):

IMPORTANT NOTE: The information recorded on this form has not necessarily been verified by the Corps and should not be relied upon for later jurisdictional determinations.

Signature and Date of Regulatory Project Manager (REQUIRED)

Kelly Thames 05/30/19
Signature and Date of Person Requesting Preliminary JD (REQUIRED, unless obtaining the signature is impracticable)

EXPLANATION OF PRELIMINARY AND APPROVED JURISDICTIONAL DETERMINATIONS:

1. The Corps of Engineers believes that there may be jurisdictional waters of the United States on the subject site, and the permit applicant or other affected party who requested this preliminary JD is hereby advised of his or her option to request and obtain an approved jurisdictional determination (JD) for that site. Nevertheless, the permit applicant or other person who requested this preliminary JD has declined to exercise the option to obtain an approved JD in this instance and at this time.

2. In any circumstance where a permit applicant obtains an individual permit, or a Nationwide General Permit (NWP) or other general permit verification requiring "preconstruction notification" (PCN), or requests verification for a non-reporting NWP or other general permit, and the permit applicant has not requested an approved JD for the activity, the permit applicant is hereby made aware of the following: (1) the permit applicant has elected to seek a permit authorization based on a preliminary JD, which does not make an official determination of jurisdictional waters; (2) that the applicant has the option to request an approved JD before accepting the terms and conditions of the permit authorization, and that basing a permit authorization on an approved JD could possibly result in less compensatory mitigation being required or different special conditions; (3) that the applicant has the right to request an individual permit rather than accepting the terms and conditions of the NWP or other general permit authorization; (4) that the applicant can accept a permit authorization and thereby agree to comply with all the terms and conditions of that permit, including whatever mitigation requirements the Corps has determined to be necessary; (5) that undertaking any activity in reliance upon the subject permit authorization without requesting an approved JD constitutes the applicant's acceptance of the use of the preliminary JD, but that either form of JD will be processed as soon as is practicable; (6) accepting a permit authorization (e.g., signing a proffered individual permit) or undertaking any activity in reliance on any form of Corps permit authorization based on a preliminary JD constitutes agreement that all wetlands and other water bodies on the site affected in any way by that activity are jurisdictional waters of the United States, and precludes any challenge to such jurisdiction in any administrative or judicial compliance or enforcement action, or in any administrative appeal or in any Federal court; and (7) whether the applicant elects to use either an approved JD or a preliminary JD, that JD will be processed as soon as is practicable. Further, an approved JD, a proffered individual permit (and all terms and conditions contained therein), or individual permit denial can be administratively appealed pursuant to 33 C.F.R. Part 331, and that in any administrative appeal, jurisdictional issues can be raised (see 33 C.F.R. 331.5(a)(2)). If, during that administrative appeal, it becomes necessary to make an official determination whether CWA jurisdiction exists over a site, or to provide an official delineation of jurisdictional waters on the site, the Corps will provide an approved JD to accomplish that result, as soon as is practicable.

PRELIMINARY JURISDICTIONAL DETERMINATION FORM

This preliminary JD finds that there *"may be"* waters of the United States on the subject project site, and identifies all aquatic features on the site that could be affected by the proposed activity, based on the following information:

Appendix A - Sites

District Office	Memphis District	File/ORM #		PJD Date:	May 30, 2019
State	TN	City/County	Yum Yum/Fayette	Person Requestinq PJD	Kelly Thames, PWS, TN-QHP-IT

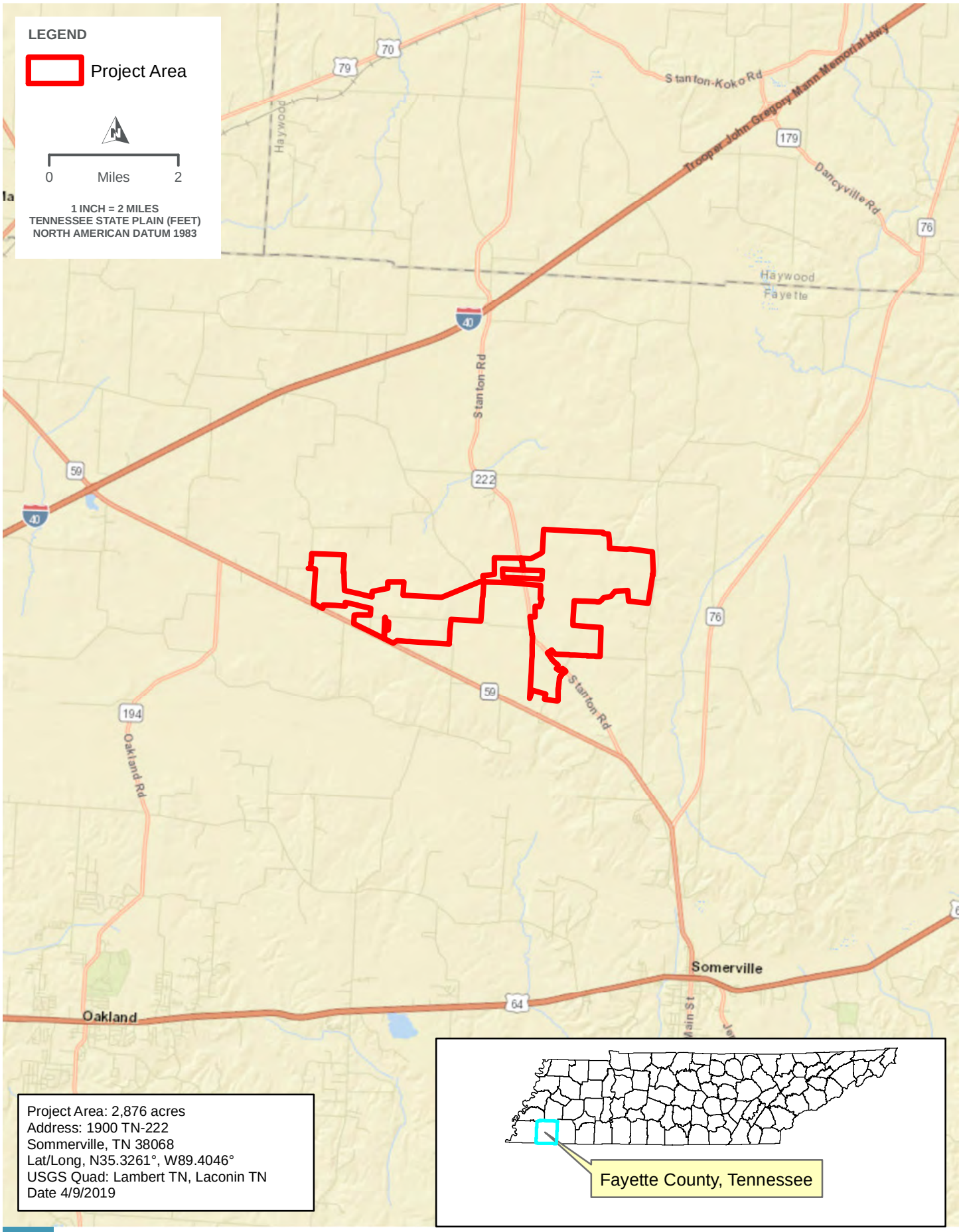
Site Number	Latitude	Longitude	Cowardin Class	Est. Amount of Aquatic Resource in Review Area	Class of Aquatic Resource
			n/a		Non-Section 10 non-wetlar
			n/a		Non-Section 10 wetland
			n/a		Non-Section 10 wetland

Notes:

See Appendix D for tables of potentially jurisdictional waters.

Appendix A

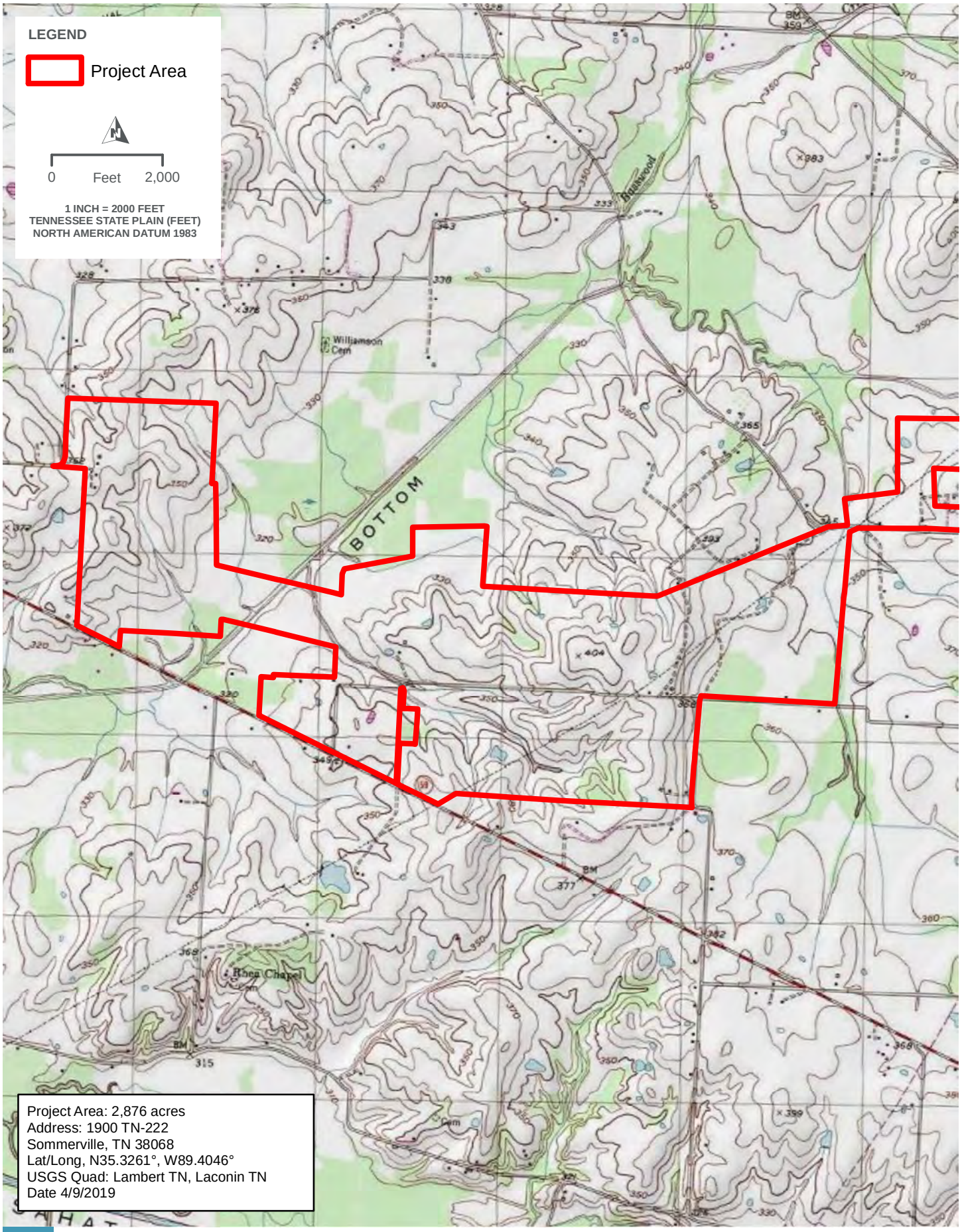
Figures



YUM YUM SOLAR SITE

PROJECT LOCATION

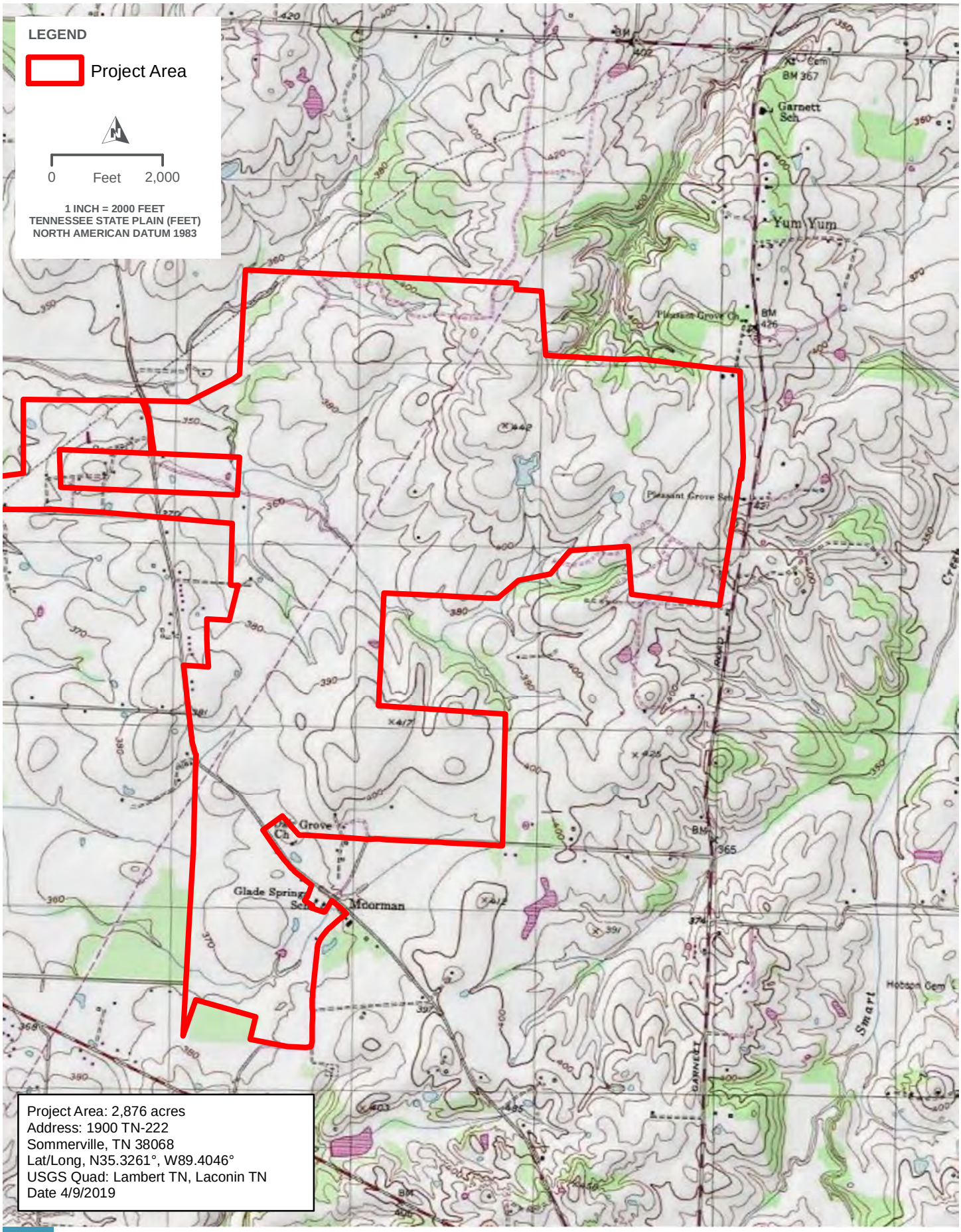
FIGURE 1



YUM YUM SOLAR SITE

USGS TOPOGRAPHIC QUADRANGLE

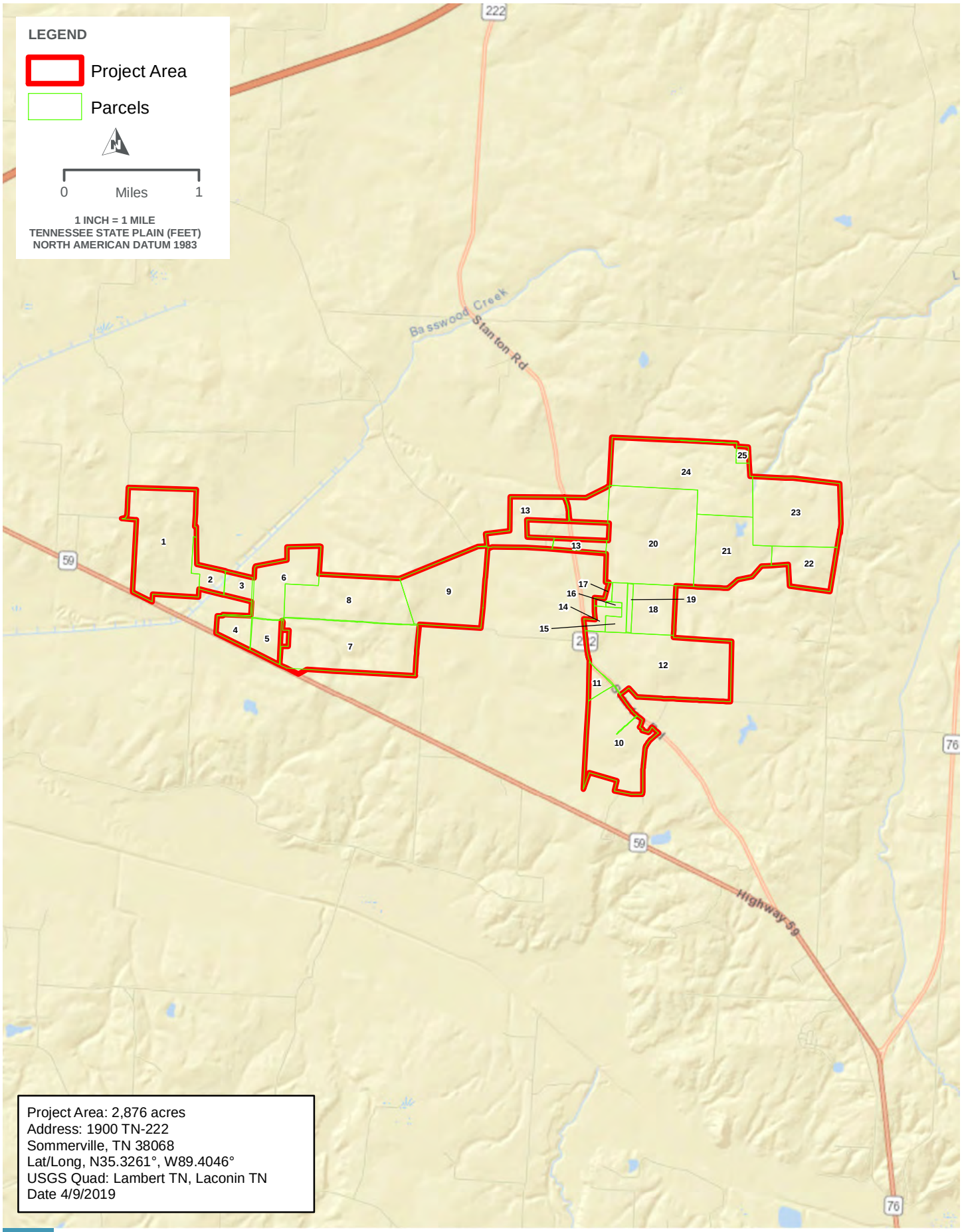
FIGURE 2A



YUM YUM SOLAR SITE

USGS TOPOGRAPHIC QUADRANGLE

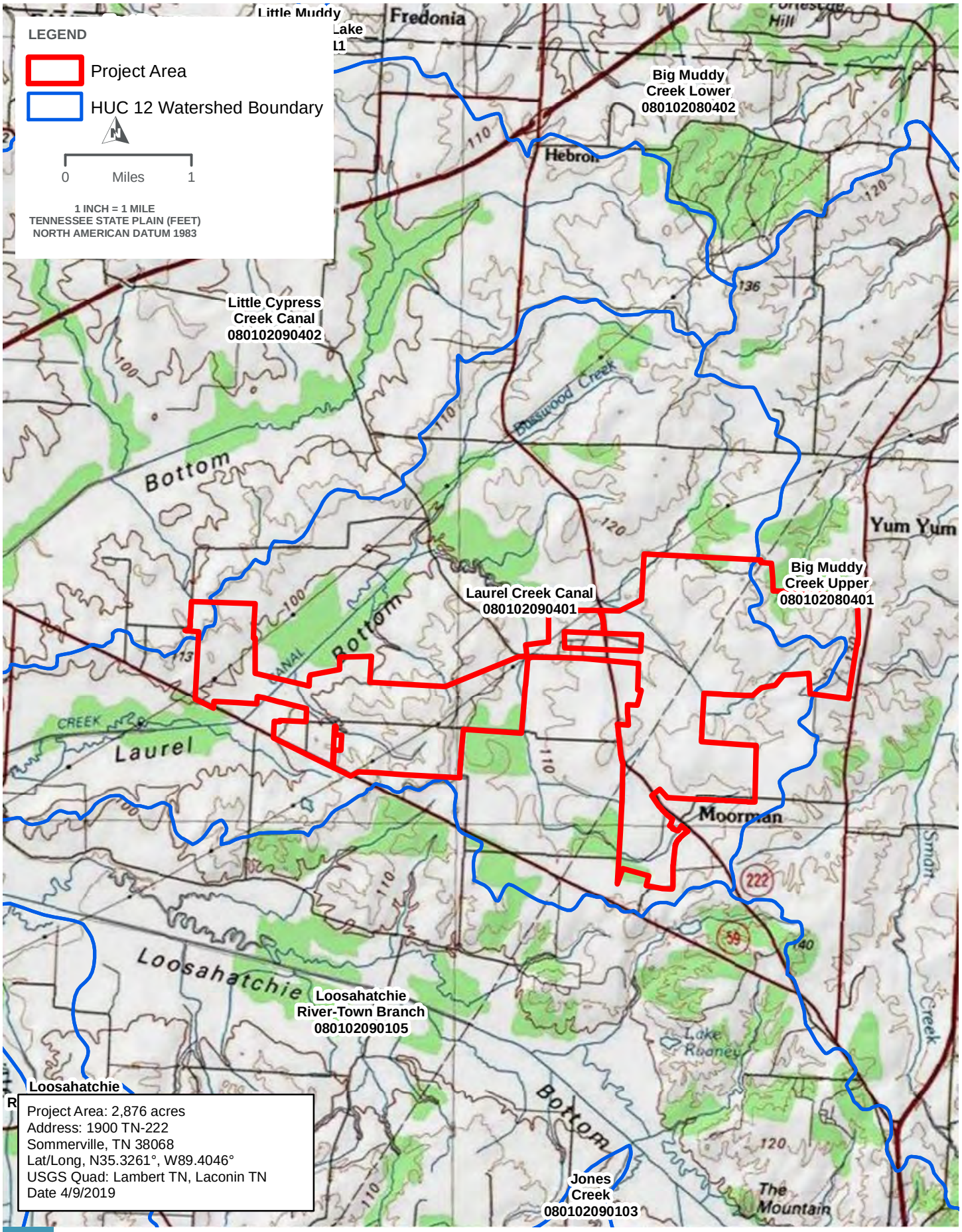
FIGURE 2B



YUM YUM SOLAR SITE

PARCEL MAP

FIGURE 3

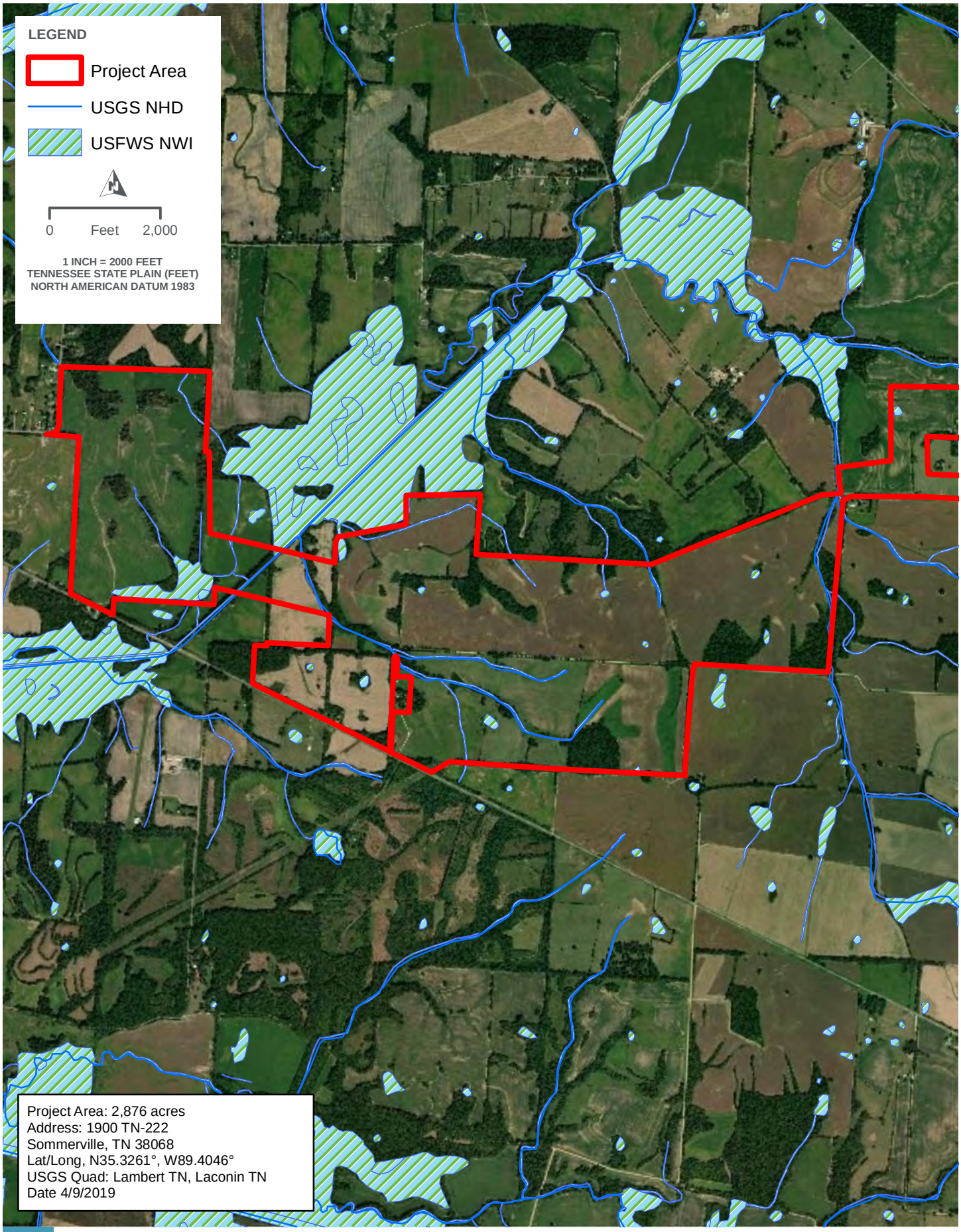


HDR

YUM YUM SOLAR SITE

HUC 12 WATERSHEDS

FIGURE 4

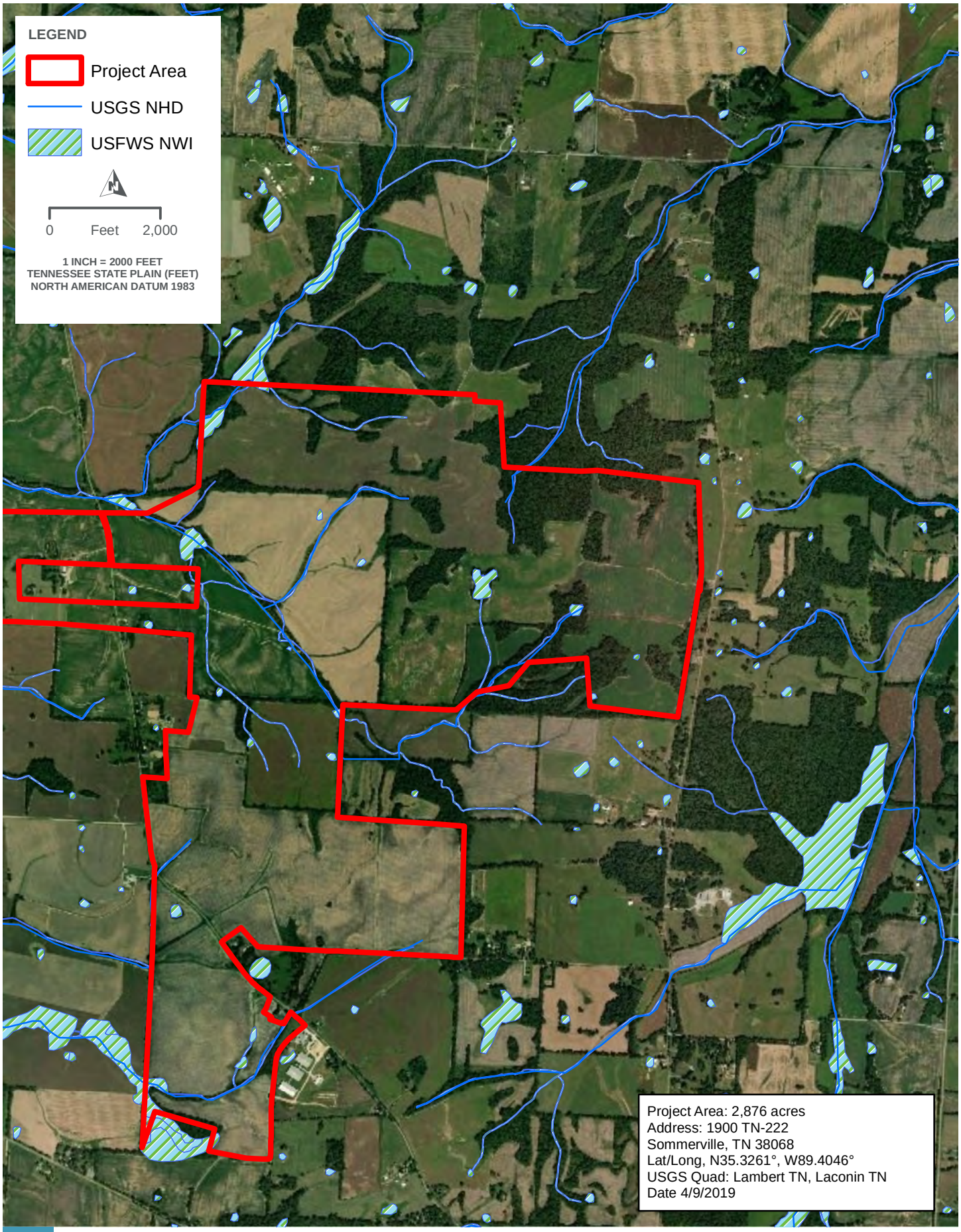


HDR

YUM YUM SOLAR SITE

NWI AND NHD DATASETS

FIGURE 5A

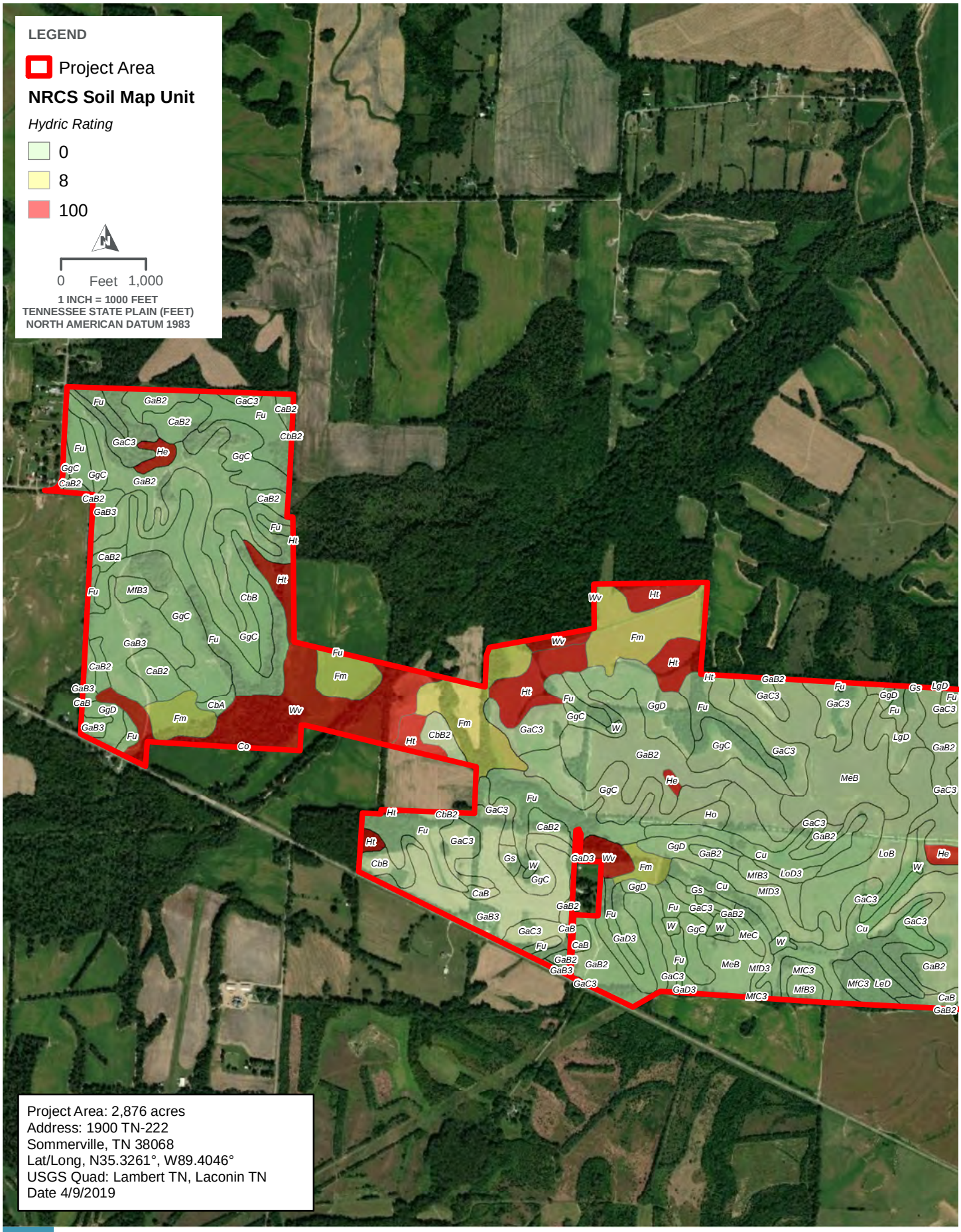


HDR

YUM YUM SOLAR SITE

NWI AND NHD DATASETS

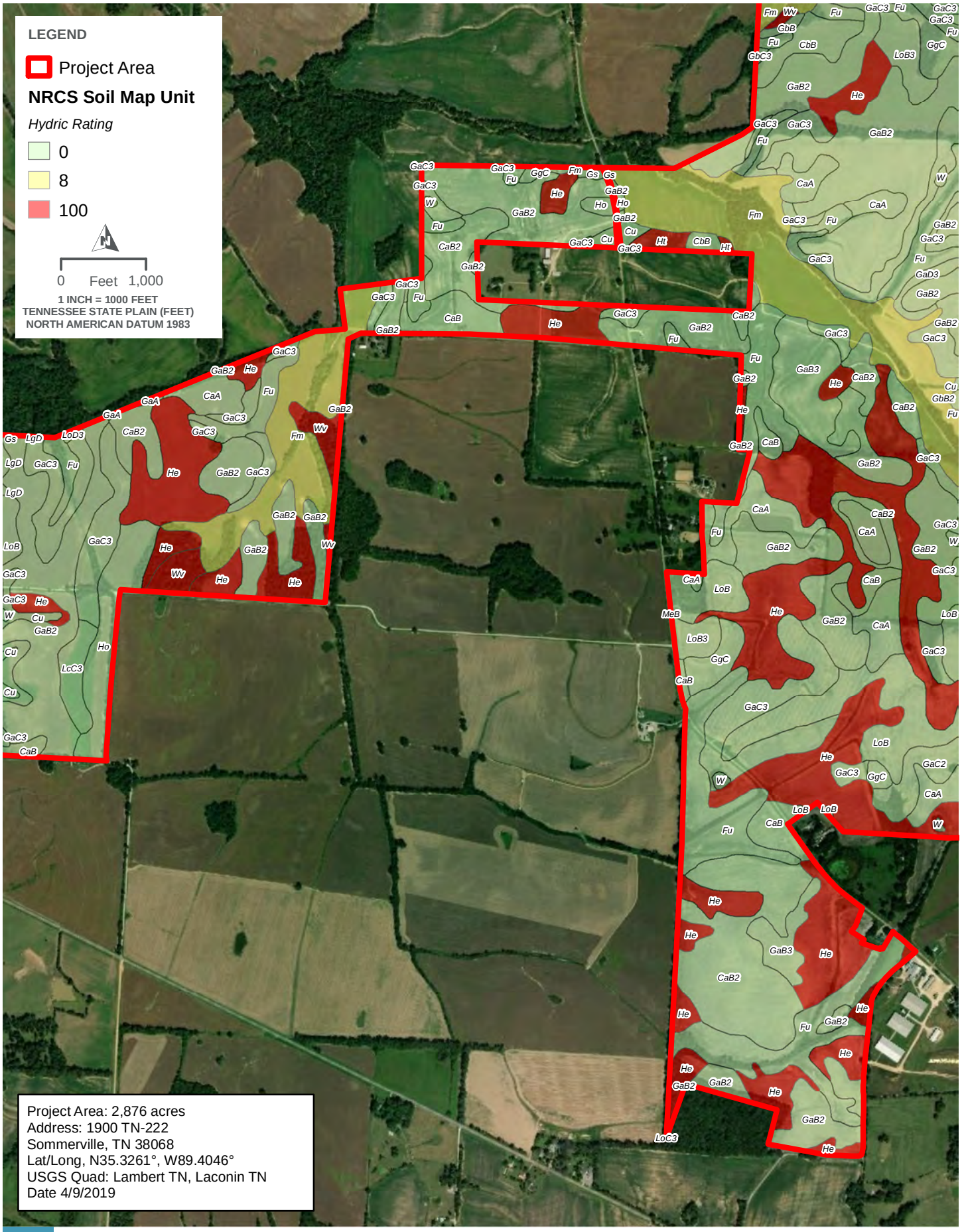
FIGURE 5B



YUM YUM SOLAR SITE

NRCS SOIL SURVEY AND HYDRIC RATINGS MAP

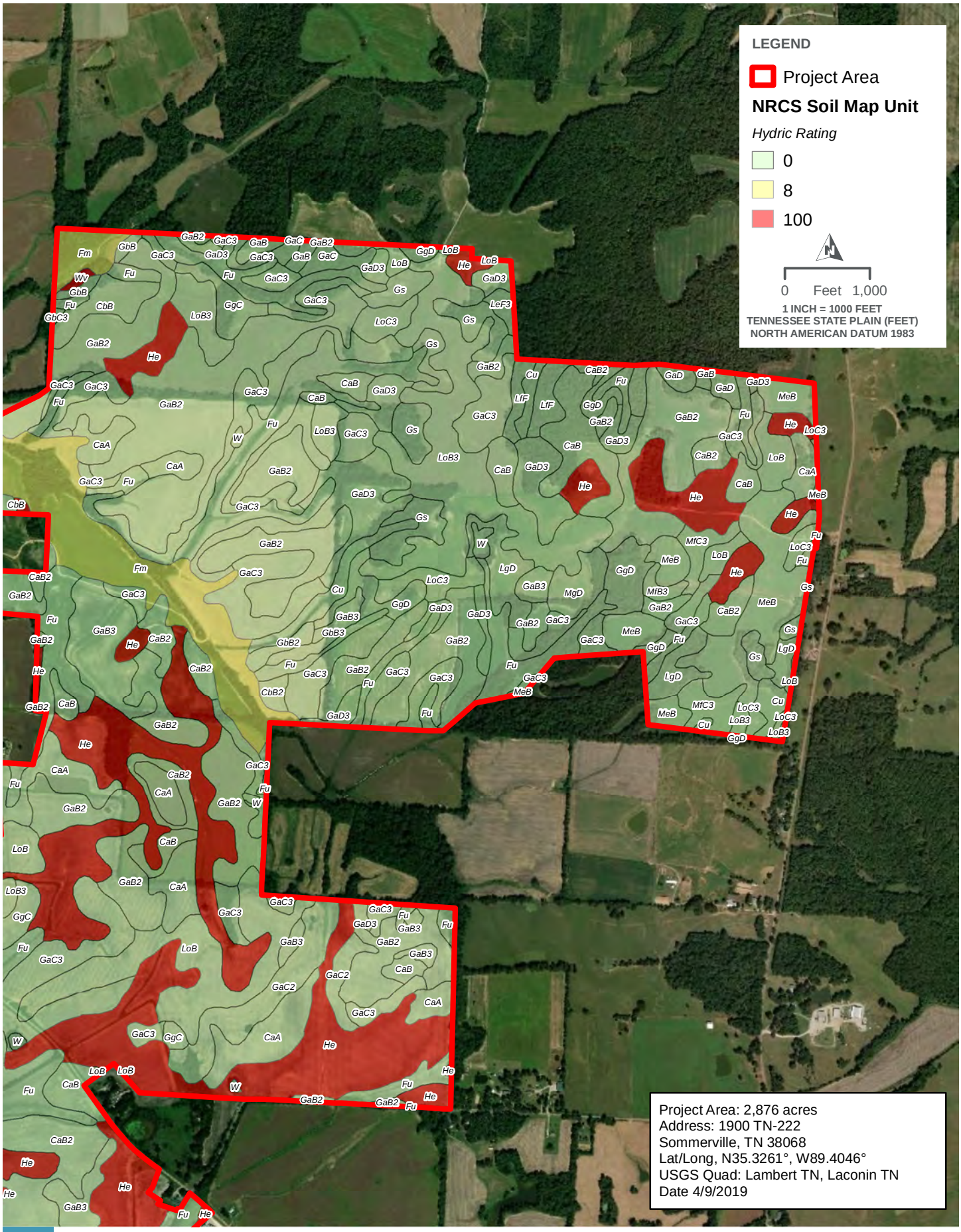
FIGURE 6A



YUM YUM SOLAR SITE

NRCS SOIL SURVEY AND HYDRIC RATINGS MAP

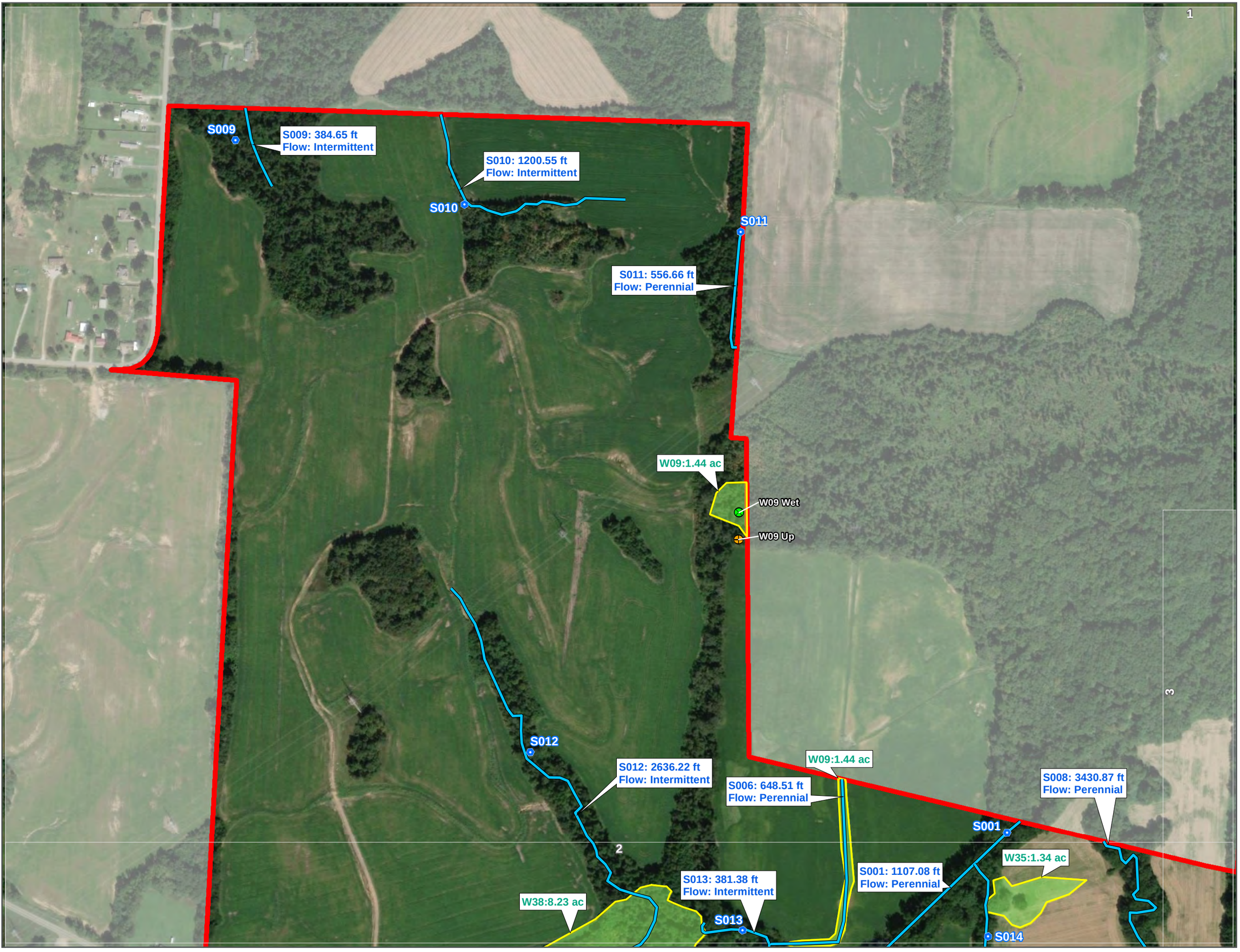
FIGURE 6B

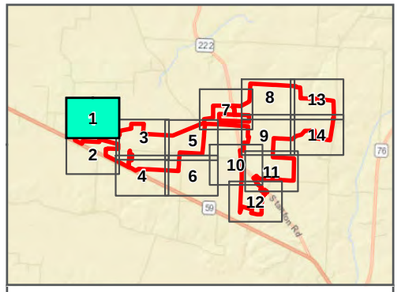


YUM YUM SOLAR SITE

NRCS SOIL SURVEY AND HYDRIC RATINGS MAP

FIGURE 6C





LEGEND

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- Delineated Open Waters
- Delineated Streams
- Stream Photo Points
- Wetland Photo Points
- Page Extents

Data Points

- Upland
- Wetland

DATA SOURCES: HDR 2019 and ESRI 2016 Imagery.

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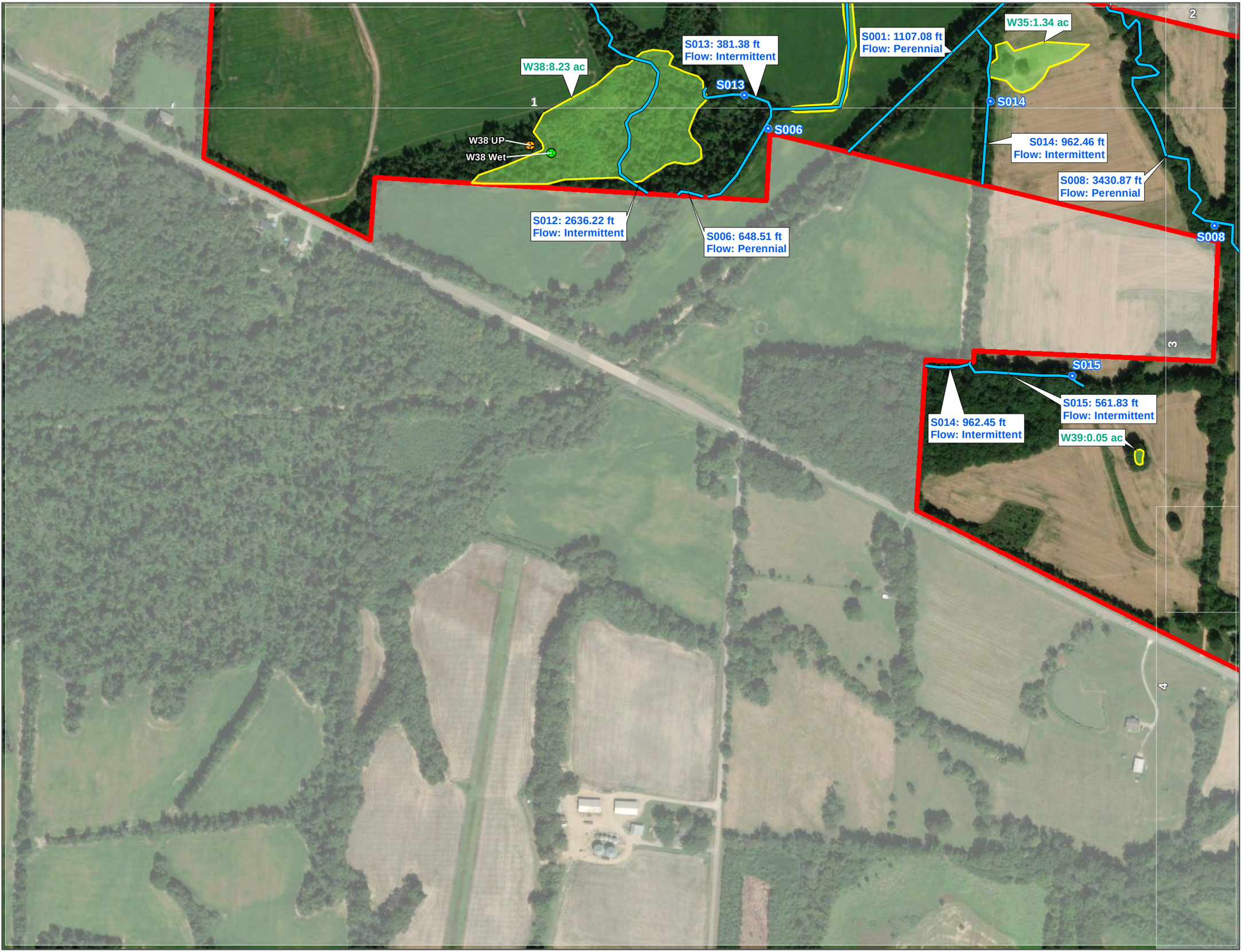
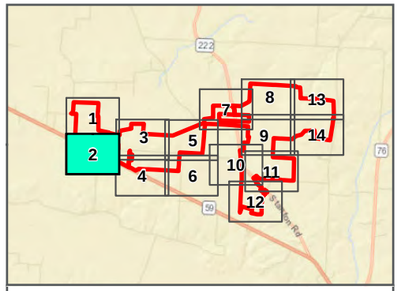
YUM YUM SOLAR SITE
DELINEATED FEATURES
FIGURE 7

WETLAND DETERMINATION AND WETLAND/WATERBODY FIELD DELINEATION REPORT





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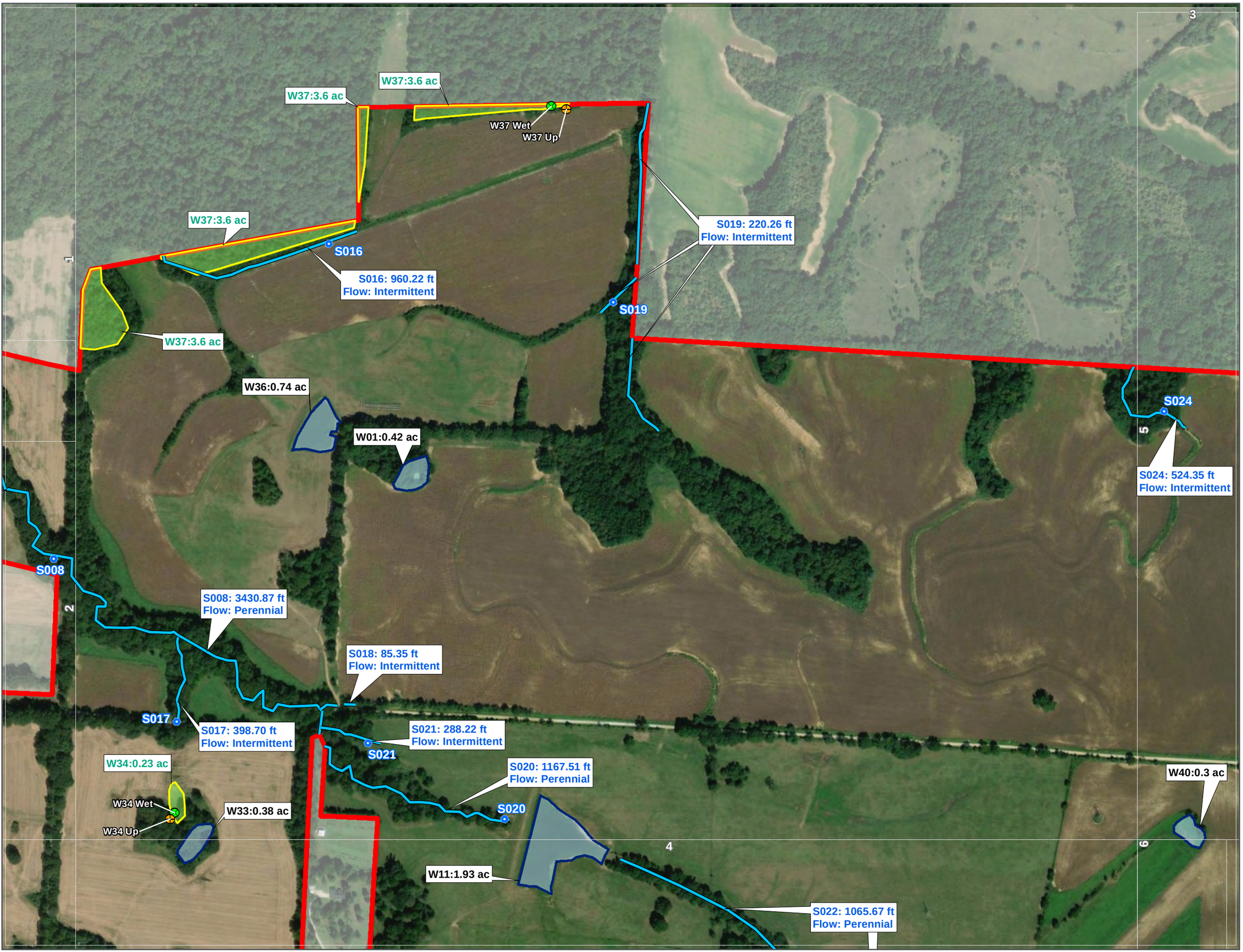

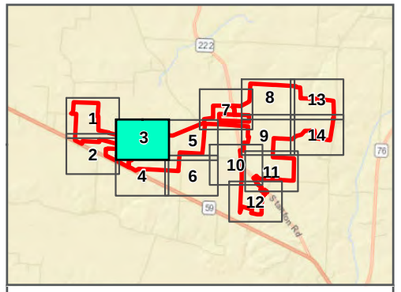

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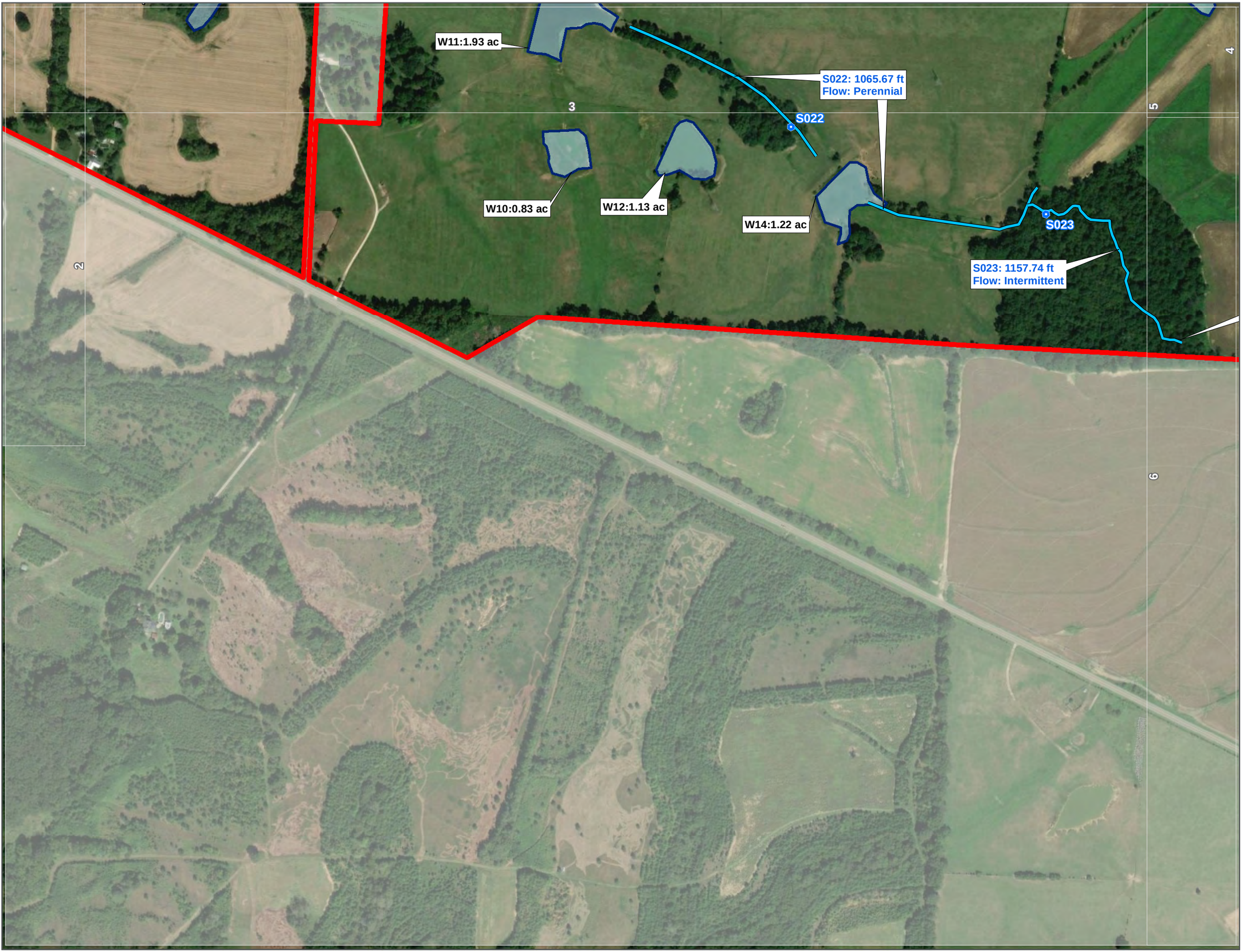

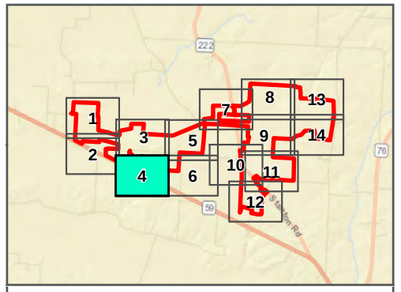

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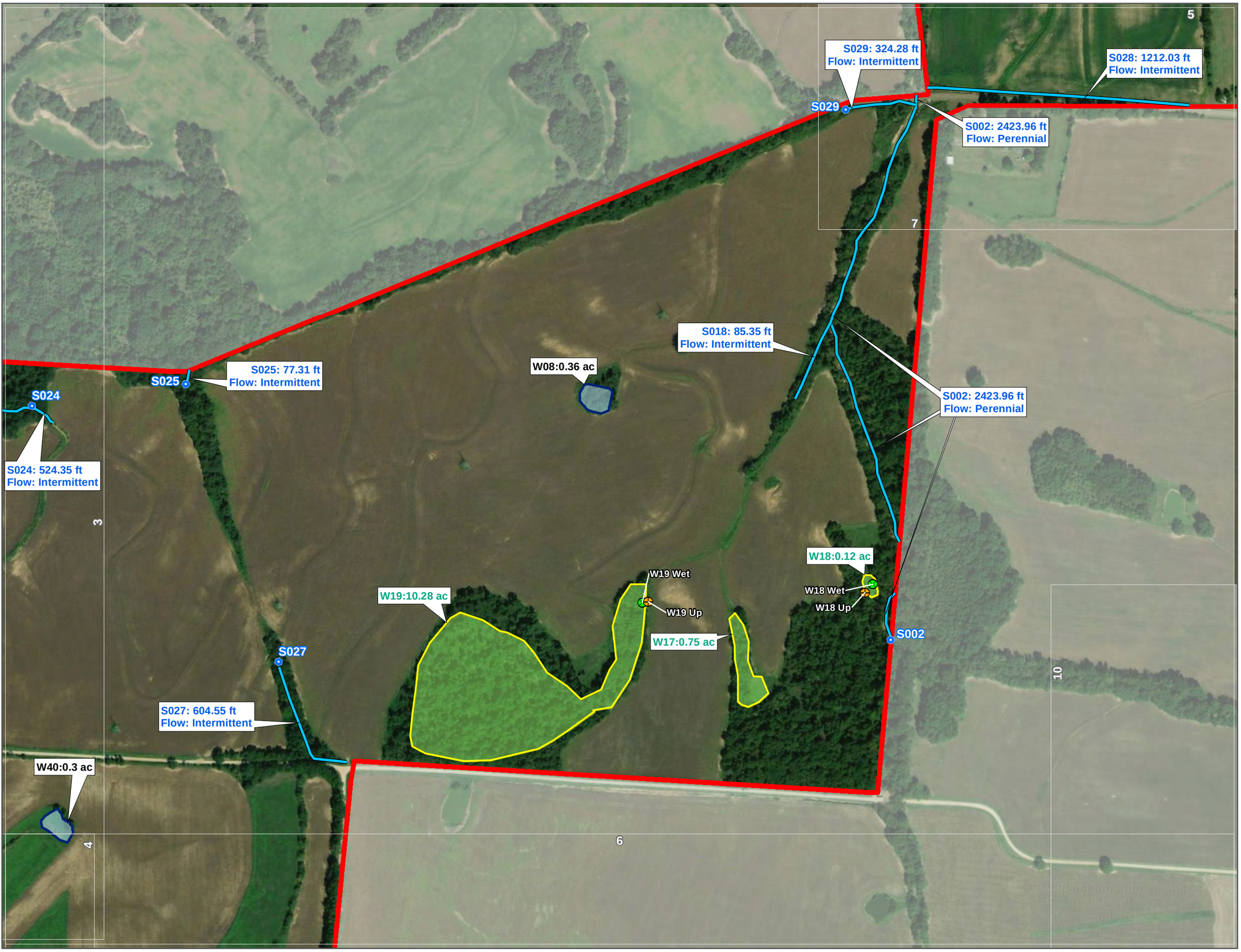

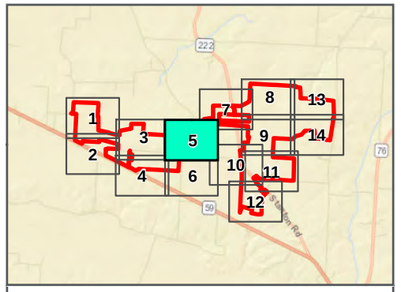

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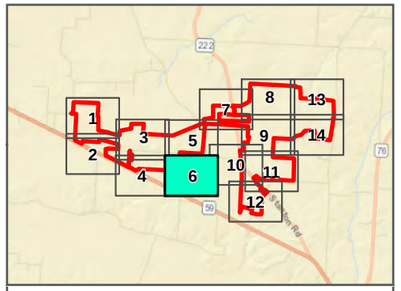

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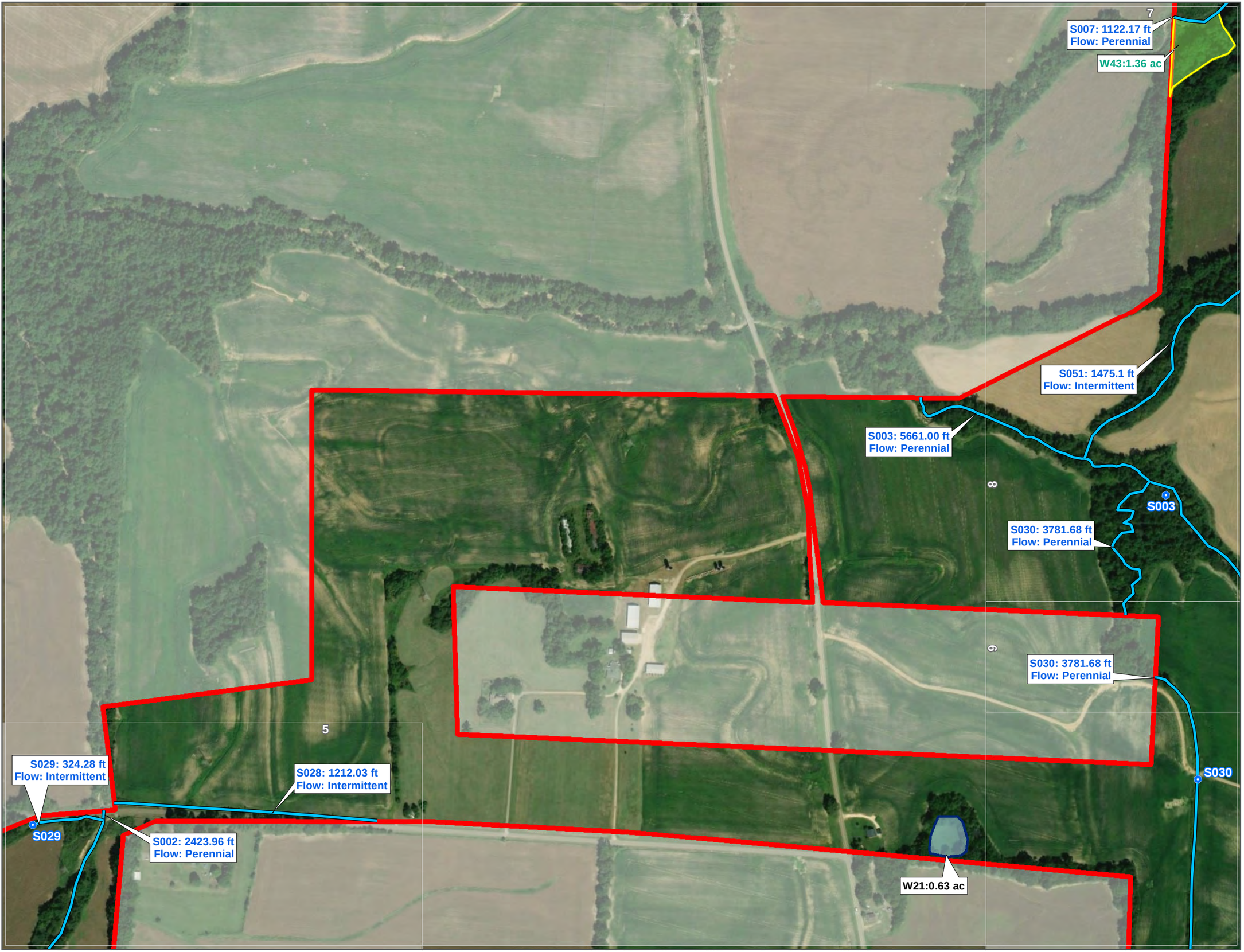

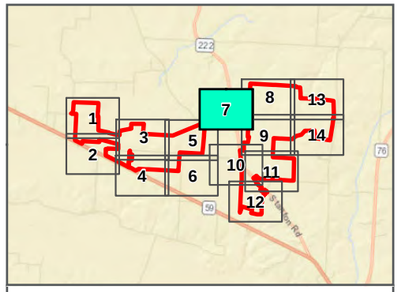

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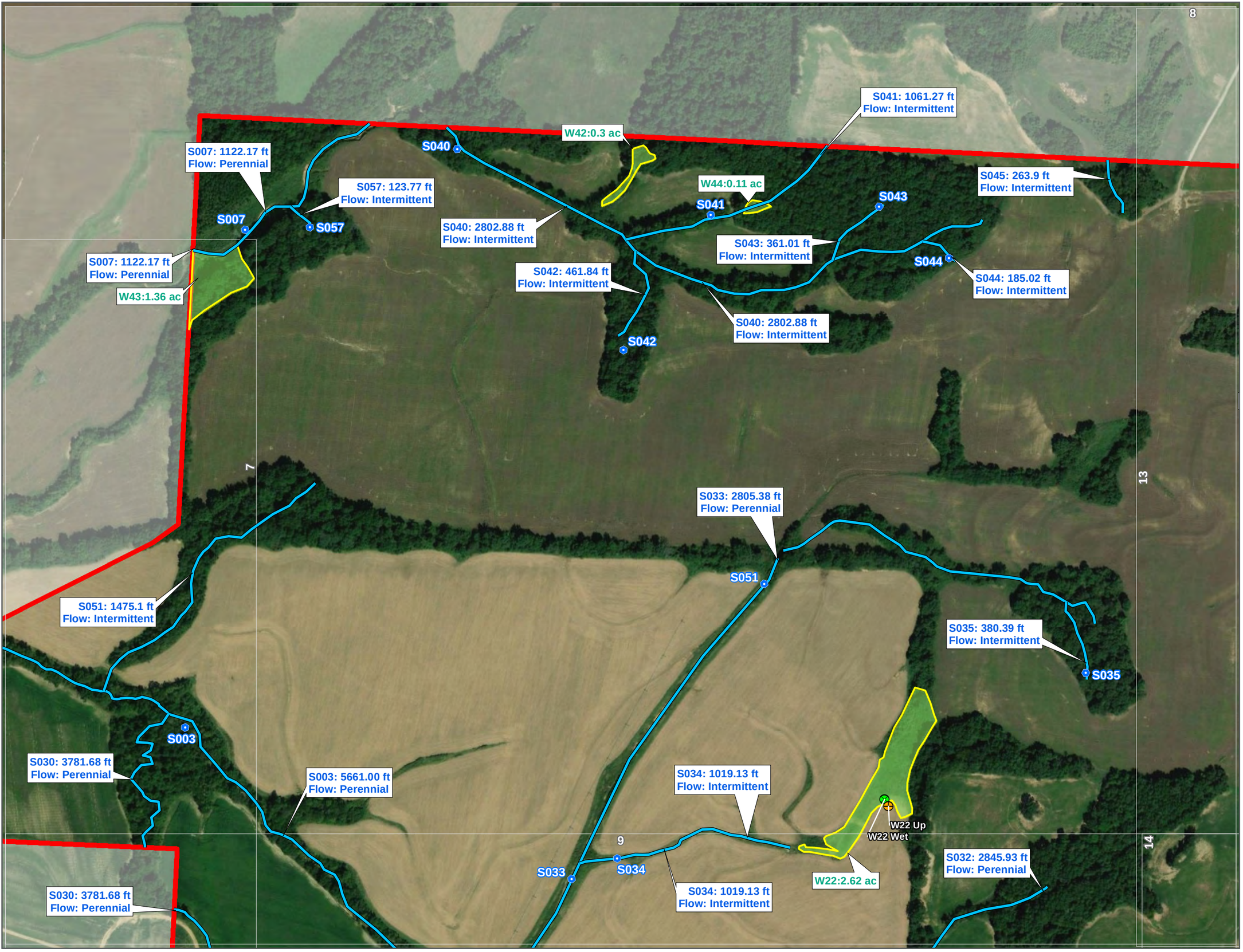

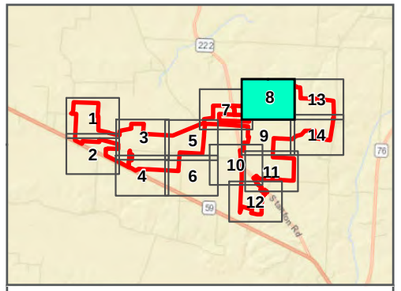

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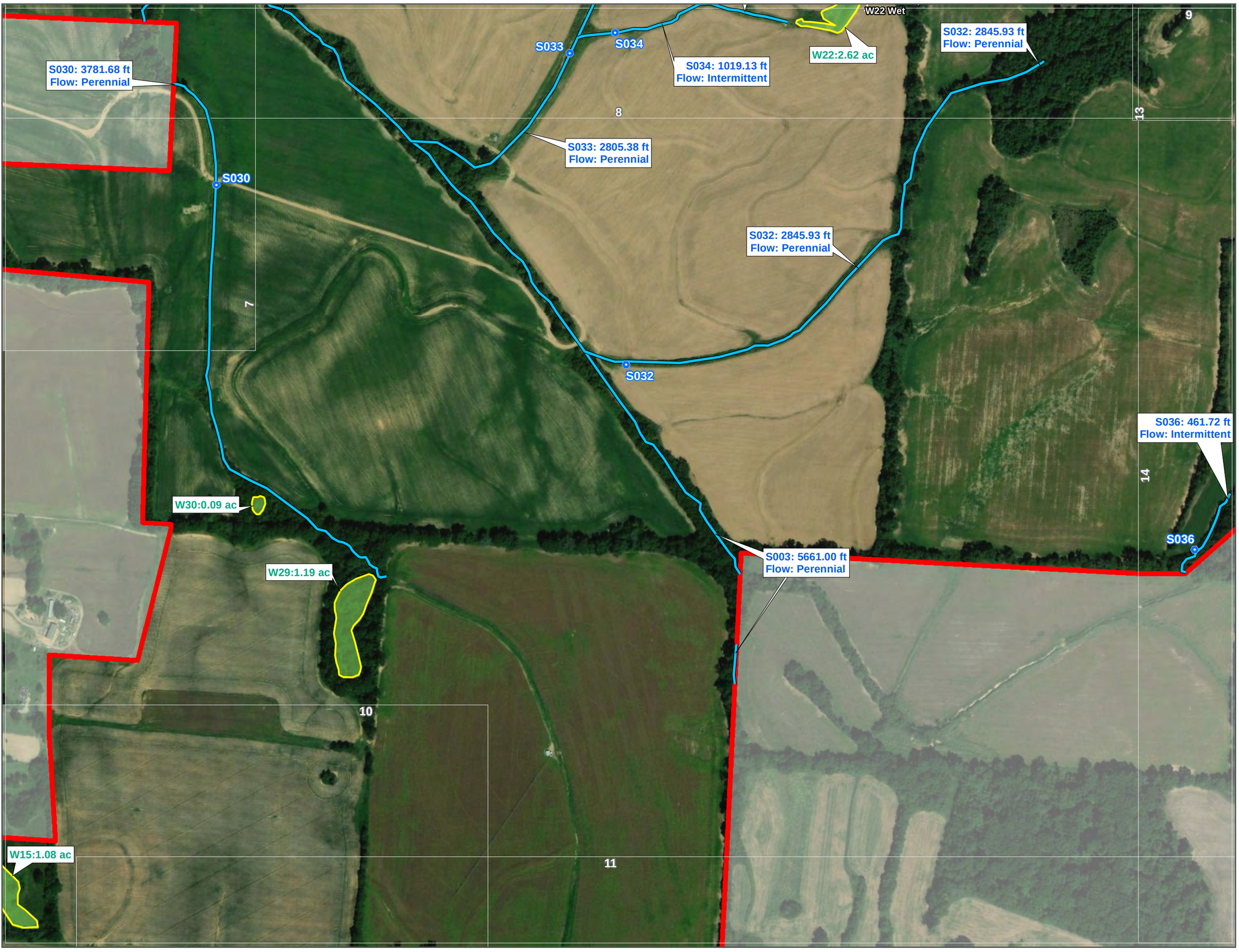

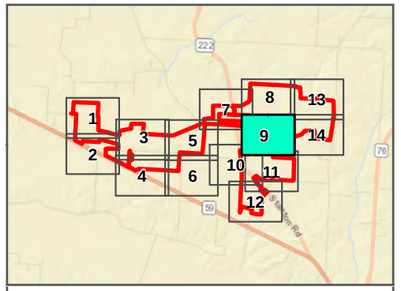

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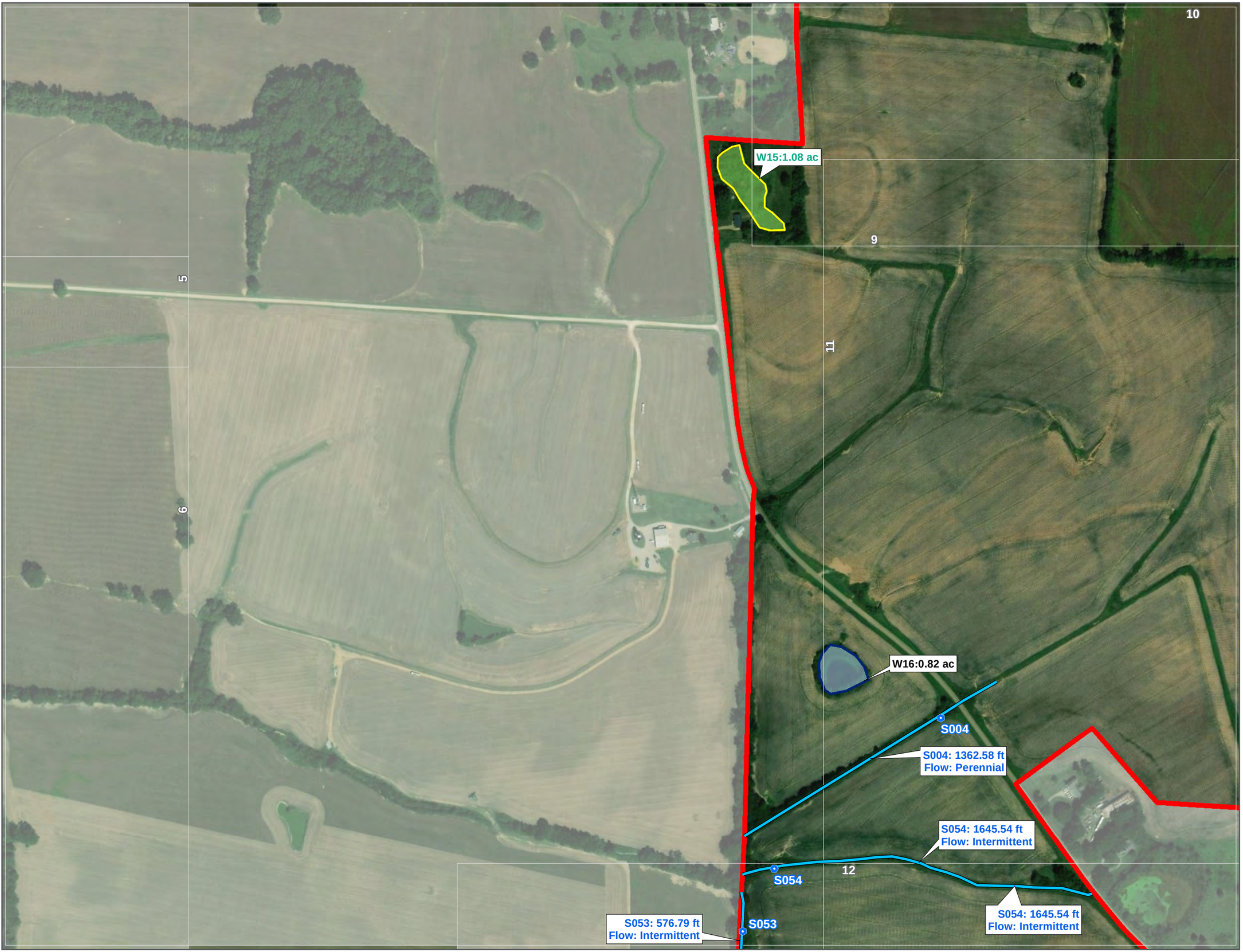

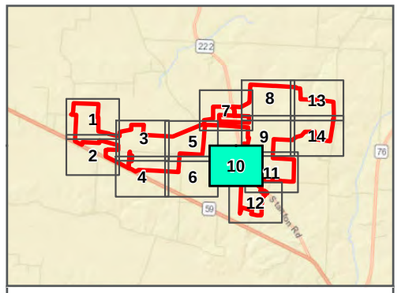

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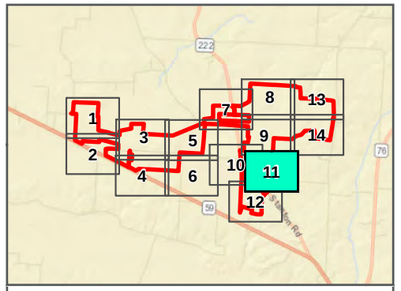

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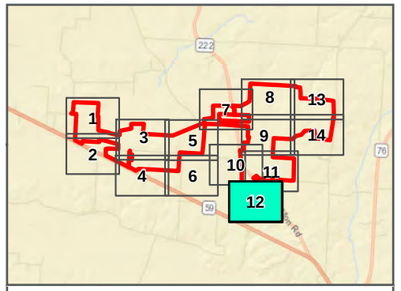

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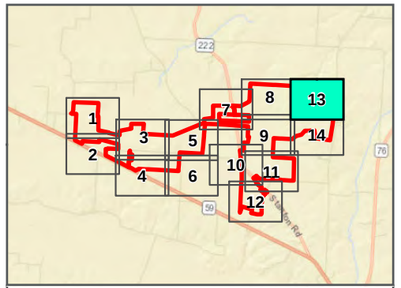

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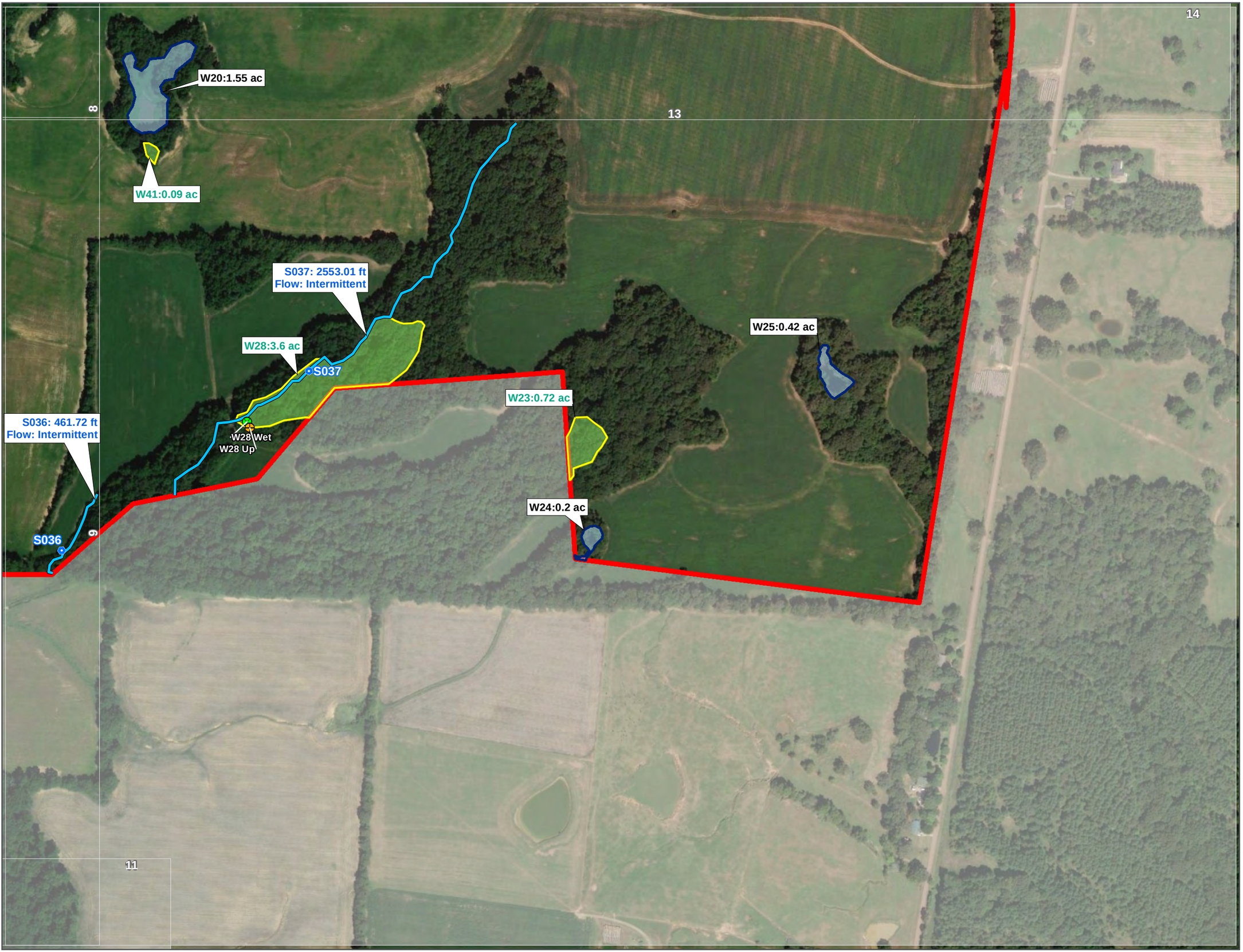

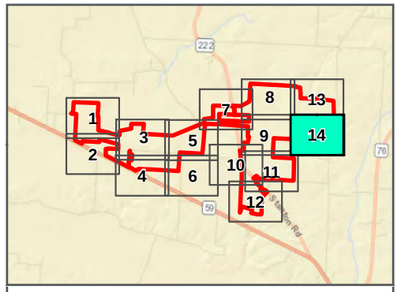

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YUM YUM SOLAR SITE
DELINEATED FEATURES
FIGURE 7

WETLAND DETERMINATION AND WETLAND/WATERBODY FIELD DELINEATION REPORT

Appendix B

Landowner Information

Table 1. Landowner information

Map ID*	Parcel Number	Owner Name	Address	City	State	Zip
1	035 03700 000035	Martha Fowler	681 W. Dr.	Memphis	TN	38112
2	044 02200 000044	Earnest McNabb	350 McNabb Rd.	Somerville	TN	38068
3	044 02400 000044	C.A. McNabb	8360 Hwy 59	Somerville	TN	38068
4	044 02700 000044	McNabb Dollahite Family Partners LP	8675 Highway 59	Somerville	TN	38068
5	044 02700 000044	McNabb Dollahite Family Partners LP	8676 Highway 59	Somerville	TN	38068
6	044 02500 000044	William W. Wilson	410 N West St	Somerville	TN	38068
7	045 02100 000045	William W. Wilson	411 N West St	Somerville	TN	38068
8	044 02600 000044	Fowler Properties LLC	681 W. Dr.	Memphis	TN	38112
9	034 01000 000034	Fowler Properties LLC	681 W. Dr.	Memphis	TN	38112
10	045 01700 000045	Winfrey W Whitson	2000 Highway 222	Somerville	TN	38068
11	045 01700 000045	Winfrey W Whitson	2000 Highway 222	Somerville	TN	38068
12	045 01700 000045	Winfrey W Whitson	2000 Highway 222	Somerville	TN	38068
13	044 02600 000044	Fowler Properties LLC	681 W. Dr.	Memphis	TN	38112
14	045 01700 000045	Winfrey W Whitson	2000 Highway 222	Somerville	TN	38068
15	045 01700 000045	Winfrey W Whitson	2000 Highway 222	Somerville	TN	38068
16	045 01700 000045	Winfrey W Whitson	2000 Highway 222	Somerville	TN	38068
17	045 01700 000045	Winfrey W Whitson	2000 Highway 222	Somerville	TN	38068
18	045 01400 000045	Charles Dacus	413 Oak St	Somerville	TN	38068
19	045 01700 000045	Winfrey W Whitson	2000 Highway 222	Somerville	TN	38068
20	034 01000 000034	Fowler Properties LLC	681 W. Dr.	Memphis	TN	38112
21	046 00100 000046	William Rutledge Garnett	4115 Yum Yum Rd	Somerville	TN	38068
22	046 00101 000046	W R Garnett Estate	4115 Yum Yum Rd	Somerville	TN	38068
23	046 01400 000033	William Rutledge Garnett	4115 Yum Yum Rd	Somerville	TN	38068
24	034 00800 000034	Meux Family Farms LLC	23 E Square Ln	Richmond	VA	23238
25	046 01300 000033	William Rutledge Garnett	4115 Yum Yum Rd	Somerville	TN	38068

Appendix C

Project Area Soils

Table 1. Project Area soil map units

Map Unit Symbol	Map Unit Name	Hydric Rating (%)
CaA	Calloway silt loam, 0 to 2 percent slopes	0
CaB	Calloway silt loam, 2 to 5 percent slopes	0
CaB2	Calloway silt loam, 2 to 5 percent slopes, eroded	0
CbA	Calloway silt loam, terrace, 0 to 2 percent slopes	0
CbB	Calloway silt loam, terrace, 2 to 5 percent slopes	0
CbB2	Calloway silt loam, terrace, 2 to 5 percent slopes, eroded	0
Co	Collins silt loam, 0 to 2 percent slopes, occasionally flooded, brief duration	0
Cu	Collins silt loam, local alluvium, 0 to 2 percent slopes, occasionally flooded, brief duration	0
Fm	Falaya silt loam	8
Fu	Falaya silt loam, local alluvium	0
GaA	Grenada silt loam, 0 to 2 percent slopes	0
GaB	Grenada silt loam, 2 to 5 percent slopes	0
GaB2	Grenada silt loam, 2 to 5 percent slopes, eroded	0
GaB3	Grenada silt loam, 2 to 5 percent slopes, severely eroded	0
GaC	Grenada silt loam, 5 to 8 percent slopes	0
GaC2	Grenada silt loam, 5 to 8 percent slopes, eroded	0
GaC3	Grenada silt loam, 5 to 8 percent slopes, severely eroded	0
GaD	Grenada silt loam, 8 to 12 percent slopes	0
GaD3	Grenada silt loam, 8 to 12 percent slopes, severely eroded	0
GbB	Grenada silt loam, terrace, 2 to 5 percent slopes	0
GbB2	Grenada silt loam, terrace, 2 to 5 percent slopes, eroded	0
GbB3	Grenada silt loam, terrace, 2 to 5 percent slopes, severely eroded	0
GbC3	Grenada silt loam, terrace, 5 to 8 percent slopes, severely eroded	0
GgC	Grenada-Gullied land complex, 5 to 8 percent slopes	0
GgD	Grenada-Gullied land complex, 8 to 12 percent slopes	0
Gs	Gullied land, silty	0
He	Henry silt loam	100
Ho	Henry silt loam, overwash	0

Map Unit Symbol	Map Unit Name	Hydric Rating (%)
Ht	Henry silt loam, terrace	100
LcC3	Lexington silty clay loam, 5 to 8 percent sloping severely eroded	0
LeD	Lexington-Ruston complex, 8 to 12 slopes (lexington-smithdale)	0
LeF3	Lexington-Ruston complex, 12 to 30 percent slopes, severely eroded (lexington-smithdale)	0
LfF	Lexington-Ruston-Gullied land complex, 12 to 30 percent slopes (lexington-smithdale-gullied land)	0
LgD	Loring-Gullied land complex, 5 to 12 percent slopes	0
LoB	Loring silt loam, 2 to 5 percent slopes	0
LoB3	Loring silt loam, 2 to 5 percent slopes, severely eroded	0
LoC3	Loring silt loam, 5 to 8 percent slopes, severely eroded	0
LoD3	Loring silt loam, 8 to 12 percent slopes, severely eroded	0
MeB	Memphis silt loam, 2 to 5 percent slopes	0
MeC	Memphis silt loam, 5 to 8 percent slopes, north	0
MfB3	Memphis silty clay loam, 2 to 5 percent slopes, severely eroded	0
MfC3	Memphis silty clay loam, 5 to 8 percent slopes, severely eroded	0
MfD3	Memphis silty clay loam, 8 to 12 percent slopes, severely eroded	0
MgD	Memphis-Gullied land complex, 5 to 12 percent slopes	0
W	Water	0
Wv	Waverly silt loam, 0 to 2 percent slopes, frequently flooded, long duration	100

Appendix D

Potentially Jurisdictional Waters

Table 1. Summary of on-site jurisdictional streams

Feature ID	Type of Aquatic Resource	Flow Type	USGS Identified Stream	Feature Length (ft.)	Latitude	Longitude	Figure 7 Page Number
S001 (Laurel Creek Canal)	Non-Section 10 – Non Wetland	Perennial	Yes	1107.08	-89.445706	35.325984	7-1
S002	Non-Section 10 – Non Wetland	Perennial	Yes	2423.96	-89.411821	35.328263	7-5
S003	Non-Section 10 – Non Wetland	Perennial	Yes	5661.00	-89.393011	35.333945	7-8
S004	Non-Section 10 – Non Wetland	Perennial	Yes	1362.58	-89.394686	35.315554	7-10
S005	Non-Section 10 – Non Wetland	Perennial	Yes	3490.46	-89.391264	35.308142	7-12
S006	Non-Section 10 – Non Wetland	Perennial	-	1722.14	-89.447134	35.325517	7-2
S007	Non-Section 10 – Non Wetland	Perennial	Yes	1122.17	-89.393156	35.341899	7-8
S008	Non-Section 10 – Non Wetland	Perennial	Yes	3430.87	-89.441032	35.323945	7-3
S009	Non-Section 10 – Non Wetland	Intermittent	-	384.65	-89.456608	35.335245	7-1
S010	Non-Section 10 – Non Wetland	Intermittent	-	1200.55	-89.452756	35.334523	7-1
S011	Non-Section 10 – Non Wetland	Perennial	-	556.66	-89.449103	35.333647	7-1
S012	Non-Section 10 – Non Wetland	Intermittent	-	2636.22	-89.451262	35.326943	7-1
S013	Non-Section 10 – Non Wetland	Intermittent	-	381.38	-89.448769	35.325567	7-2
S014	Non-Section 10 – Non Wetland	Intermittent	-	962.46	-89.444885	35.325260	7-2
S015	Non-Section 10 – Non Wetland	Intermittent	-	561.83	-89.444140	35.322158	7-2
S016	Non-Section 10 – Non Wetland	Intermittent	-	960.22	-89.438318	35.327930	7-3
S017	Non-Section 10 – Non Wetland	Intermittent	-	398.70	-89.439235	35.322686	7-3
S018	Non-Section 10 – Non Wetland	Intermittent	-	528.44	-89.412150	35.327582	7-3
S019	Non-Section 10 – Non Wetland	Intermittent	-	1468.27	-89.432475	35.328150	7-3

Feature ID	Type of Aquatic Resource	Flow Type	USGS Identified Stream	Feature Length (ft.)	Latitude	Longitude	Figure 7 Page Number
S020	Non-Section 10 – Non Wetland	Perennial	Yes	1167.51	-89.435938	35.321347	7-3
S021	Non-Section 10 – Non Wetland	Intermittent	-	288.22	-89.436643	35.322034	7-3
S022	Non-Section 10 – Non Wetland	Perennial	Yes	1970.52	-89.429632	35.319198	7-4
S023	Non-Section 10 – Non Wetland	Intermittent	-	1157.74	-89.424756	35.317979	7-4
S024	Non-Section 10 – Non Wetland	Intermittent	-	524.35	-89.424722	35.326414	7-3
S025	Non-Section 10 – Non Wetland	Intermittent	Yes	77.31	-89.421878	35.326903	7-5
S027	Non-Section 10 – Non Wetland	Intermittent	-	604.55	-89.419936	35.322513	7-5
S028	Non-Section 10 – Non Wetland	Intermittent	-	1212.03	-89.408582	35.330870	7-5
S029	Non-Section 10 – Non Wetland	Intermittent	-	324.28	-89.411304	35.330681	7-5
S030	Non-Section 10 – Non Wetland	Perennial	-	3781.68	-89.393956	35.330701	7-9
S032	Non-Section 10 – Non Wetland	Perennial	-	2845.93	-89.383962	35.330924	7-9
S033	Non-Section 10 – Non Wetland	Perennial	Yes	4457.52	-89.386626	35.336379	7-8
S034	Non-Section 10 – Non Wetland	Intermittent	-	1019.13	-89.386814	35.334076	7-8
S035	Non-Section 10 – Non Wetland	Intermittent	-	380.39	-89.380810	35.336768	7-8
S036	Non-Section 10 – Non Wetland	Intermittent	-	461.72	-89.378392	35.327654	7-9
S037	Non-Section 10 – Non Wetland	Intermittent	Yes	2553.01	-89.374003	35.330340	7-14
S038	Non-Section 10 – Non Wetland	Intermittent	Yes	1348.42	-89.375748	35.337712	7-13
S039	Non-Section 10 – Non Wetland	Intermittent	-	144.36	-89.376105	35.337254	7-13
S040	Non-Section 10 – Non Wetland	Intermittent	-	2802.88	-89.386833	35.341115	7-8

Feature ID	Type of Aquatic Resource	Flow Type	USGS Identified Stream	Feature Length (ft.)	Latitude	Longitude	Figure 7 Page Number
S041	Non-Section 10 – Non Wetland	Intermittent	-	1061.27	-89.386330	35.342013	7-8
S042	Non-Section 10 – Non Wetland	Intermittent	-	461.84	-89.387699	35.340934	7-8
S043	Non-Section 10 – Non Wetland	Intermittent	-	361.01	-89.384545	35.341869	7-8
S044	Non-Section 10 – Non Wetland	Intermittent	-	185.02	-89.383160	35.341671	7-8
S045	Non-Section 10 – Non Wetland	Intermittent	-	263.90	-89.380555	35.342491	7-8
S046	Non-Section 10 – Non Wetland	Intermittent	-	563.74	-89.377416	35.340883	7-13
S047	Non-Section 10 – Non Wetland	Intermittent	-	105.54	-89.376408	35.340555	7-13
S048	Non-Section 10 – Non Wetland	Intermittent	-	164.55	-89.371872	35.339060	7-13
S049	Non-Section 10 – Non Wetland	Perennial	-	94.48	-89.368100	35.338968	7-13
S050	Non-Section 10 – Non Wetland	Perennial	-	788.08	-89.367309	35.338200	7-13
S051	Non-Section 10 – Non Wetland	Intermittent	-	1475.10	-89.394531	35.337223	7-8
S052	Non-Section 10 – Non Wetland	Intermittent	Yes	284.27	-89.389435	35.308867	7-12
S053	Non-Section 10 – Non Wetland	Intermittent	-	576.79	-89.396578	35.313021	7-12
S054	Non-Section 10 – Non Wetland	Intermittent	-	1645.54	-89.393884	35.314258	7-10
S055	Non-Section 10 – Non Wetland	Intermittent	-	376.50	-89.387753	35.315557	7-11
S056	Non-Section 10 – Non Wetland	Intermittent	-	1167.03	-89.380488	35.314993	7-11
S057	Non-Section 10 – Non Wetland	Intermittent	-	123.77	-89.393071	35.341787	7-8
			Stream Total:	**67,179 lf**			

Table 2. Summary of on-site jurisdictional impounded open waters

Feature ID*	Cowardin Classification	Type of Aquatic Resource	Feature size within Project Area (Ac)	Latitude	Longitude	Figure 7 Page Number
W01	PUB	non section 10 – non wetland	0.42	35.325348	-89.435821	7-3
W03	PUB	non section 10 - wetland	0.39	35.315471	-89.386467	7-11
W08	PUB	non section 10 - wetland	0.36	35.326836	-89.415564	7-5
W10	PUB	non section 10 - wetland	0.83	35.318977	-89.433319	7-4
W11	PUB	non section 10 - wetland	1.93	35.320723	-89.433431	7-3
W12	PUB	non section 10 - wetland	1.13	35.319004	-89.431447	7-4
W14	PUB	non section 10 - wetland	1.22	35.318519	-89.428978	7-4
W16	PUB	non section 10 - wetland	0.82	35.316662	-89.395196	7-10
W20	PUB	non section 10 - wetland	1.55	35.333399	-89.377411	7-14
W21	PUB	non section 10 - wetland	0.63	35.330844	-89.397741	7-7
W24	PUB	non section 10 - wetland	0.20	35.327860	-89.370440	7-14
W25	PUB	non section 10 - wetland	0.42	35.330043	-89.366797	7-14
W33	PUB	non section 10 - wetland	0.38	35.320606	-89.438980	7-3
W36	PUB	non section 10 - wetland	0.74	35.325879	-89.437302	7-3
W40	PUB	non section 10 - wetland	0.30	35.321180	-89.423647	7-3
	Impounded Open Waters Total:		**11.32 ac**			

Table 2. Summary of on-site jurisdictional wetlands

Feature ID*	Cowardin Classification	Type of Aquatic Resource	Feature size within Project Area (Ac)	Latitude	Longitude	Figure 7 Page Number	Data Form Sampling Point
W09	PEM	non section 10 - wetland	1.44	35.328341	-89.447987	7-1	W09
W15	PEM/FO	non section 10 - wetland	1.08	35.322710	-89.396886	7-10	W22
W17	PFO	non section 10 - wetland	0.75	35.323485	-89.413104	7-5	W19
W18	PEM	non section 10 - wetland	0.12	35.324578	-89.411224	7-5	W18
W19	PFO	non section 10 - wetland	10.28	35.323116	-89.416767	7-5	W19
W22	PEM	non section 10 - wetland	2.62	35.334969	-89.383707	7-8	W22
W23	PFO	non section 10 - wetland	0.76	35.329080	-89.370597	7-14	W28
W26	PFO	non section 10 - wetland	0.44	35.336255	-89.364865	7-13	W26
W27	PFO	non section 10 - wetland	4.30	35.335953	-89.370792	7-13	W27
W28	PFO	non section 10 - wetland	3.60	35.329845	-89.374378	7-14	W28
W29	PFO	non section 10 - wetland	1.19	35.326190	-89.391614	7-9	W28
W30	PFO	non section 10 - wetland	0.09	35.327653	-89.393103	7-9	W28
W31	PEM	non section 10 - wetland	0.10	35.319968	-89.386769	7-11	W22
W32	PFO	non section 10 - wetland	1.64	35.306078	-89.395898	7-12	W32
W34	PEM	non section 10 - wetland	0.23	35.321098	-89.439284	7-3	W34
W35	PEM	non section 10 - wetland	1.34	35.326101	-89.444246	7-1	W34
W37	PFO	non section 10 - wetland	3.60	35.328233	-89.438567	7-3	W37
W38	PFO	non section 10 - wetland	8.23	35.325095	-89.450603	7-2	W38
W39	PFO	non section 10 - wetland	0.05	35.321168	-89.442351	7-2	W37

Feature ID*	Cowardin Classification	Type of Aquatic Resource	Feature size within Project Area (Ac)	Latitude	Longitude	Figure 7 Page Number	Data Form Sampling Point
W41	PFO	non section 10 - wetland	0.09	35.332569	-89.377417	7-14	W38
W42	PFO	non section 10 - wetland	0.30	35.342487	-89.387983	7-8	W38
W43	PFO	non section 10 - wetland	1.36	35.340949	-89.394330	7-8	W38
W44	PFO	non section 10 - wetland	0.10	35.342095	-89.386048	7-8	W38
W45	PEM	non section 10 - wetland	0.10	35.339627	-89.377240	7-13	W22
		Wetland Total:	**43.81 ac.**				

Appendix E

USACE Wetland
Determination Data Forms

U.S. Army Corps of Engineers **WETLAND DETERMINATION DATA SHEET – Atlantic and Gulf Coastal Plain Region** See ERDC/EL TR-07-24; the proponent agency is CECW-CO-R	*Requirement Control Symbol EXEMPT (Authority: AR 335-15, paragraph 5-2a)*

Project/Site: Yum Yum Solar City/County: Fayette Sampling Date: 1/14/2019

Applicant/Owner: Invenergy State: TN Sampling Point: W09 Up

Investigator(s): Michael Swenson Section, Township, Range: _____

Landform (hillside, terrace, etc.): Flat Local relief (concave, convex, none): None Slope (%): 0

Subregion (LRR or MLRA): LRR P, MLRA 134 Lat: 35.330109 Long: -89.447502 Datum: WGS84

Soil Map Unit Name: Grenada-Gullied land complex, 5 to 8 percent slopes NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation X, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ___	**Is the Sampled Area within a Wetland?** **Yes** ___ **No** X
Hydric Soil Present?	Yes ___	No X	
Wetland Hydrology Present?	Yes ___	No X	

Remarks:
Upland plot is located within a row cropped agricultural field. Vegetation is disturbed in the form of agricultural activities.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15) **(LRR U)**
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Sphagnum Moss (D8) **(LRR T,U)**

Field Observations:

Surface Water Present?	Yes ___	No ___	Depth (inches): ___
Water Table Present?	Yes ___	No ___	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No ___	Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of wetland hydrology are present.

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: W09 Up

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	=Total Cover		
50% of total cover:		20% of total cover:	

Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	=Total Cover		
50% of total cover:		20% of total cover:	

Herb Stratum (Plot size: 30ft)			
1. *Gossypium hirsutum*	25	Yes	FACU
2. *Poa pratensis*	20	Yes	FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	45 =Total Cover		
50% of total cover: 23		20% of total cover: 9	

Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
50% of total cover:		20% of total cover:	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	45	x 4 =	180
UPL species	0	x 5 =	0
Column Totals:	45 (A)		180 (B)

Prevalence Index = B/A = 4.00

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (If observed, list morphological adaptations below.)

SOIL

Sampling Point: W09 Up

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-2	10YR 3/2	100					Loamy/Clayey	
2-20	10YR 4/3	100					Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Organic Bodies (A6) **(LRR, P, T, U)**
- ___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ___ Muck Presence (A8) **(LRR U)**
- ___ 1 cm Muck (A9) **(LRR P, T)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Coast Prairie Redox (A16) **(MLRA 150A)**
- ___ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR P, S, T, U)**
- ___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ___ Thin Dark Surface (S9) **(LRR S, T, U)**
- ___ Barrier Islands 1 cm Muck (S12) **(MLRA 153B, 153D)**
- ___ Loamy Mucky Mineral (F1) **(LRR O)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) **(LRR U)**
- ___ Depleted Ochric (F11) **(MLRA 151)**
- ___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ___ Umbric Surface (F13) **(LRR P, T, U)**
- ___ Delta Ochric (F17) **(MLRA 151)**
- ___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 149A, 153C, 153D)**
- ___ Very Shallow Dark Surface (F22) **(MLRA 138, 152A in FL, 154)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR O)**
- ___ 2 cm Muck (A10) **(LRR S)**
- ___ Coast Prairie Redox (A16) **(outside MLRA 150A)**
- ___ Reduced Vertic (F18) **(outside MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(LRR P, T)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 153B)**
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22) **(outside MLRA 138, 152A in FL, 154)**
- ___ Barrier Islands Low Chroma Matrix (TS7) **(MLRA 153B, 153D)**
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

No indicators of hydric soils are present.

U.S. Army Corps of Engineers **WETLAND DETERMINATION DATA SHEET – Atlantic and Gulf Coastal Plain Region** See ERDC/EL TR-07-24; the proponent agency is CECW-CO-R	*Requirement Control Symbol* *EXEMPT* *(Authority: AR 335-15, paragraph 5-2a)*

Project/Site: Yum Yum Solar City/County: Fayette Sampling Date: 1/14/2019

Applicant/Owner: Invenergy State: TN Sampling Point: W09 Wet

Investigator(s): Michael Swenson, Katie Lueth Section, Township, Range: _____

Landform (hillside, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): 0

Subregion (LRR or MLRA): LRR P, MLRA 134 Lat: 35.330452 Long: -89.447510 Datum: WGS84

Soil Map Unit Name: Grenada-Gullied land complex, 5 to 8 percent slopes NWI classification: PFO

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ___	**Is the Sampled Area within a Wetland?** **Yes** X **No** ___
Hydric Soil Present?	Yes X	No ___	
Wetland Hydrology Present?	Yes X	No ___	

Remarks:
Plot is representative of jurisdictional areas located within a forested wetland along a field edge, a small berm appears to be built along the edge of the trees.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- X Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15) **(LRR U)**
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- X FAC-Neutral Test (D5)
- ___ Sphagnum Moss (D8) **(LRR T,U)**

Field Observations:

Surface Water Present?	Yes X	No ___	Depth (inches): 0.5
Water Table Present?	Yes X	No ___	Depth (inches): 0
Saturation Present? (includes capillary fringe)	Yes X	No ___	Depth (inches): 0

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Wetland hydrology is present

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: W09 Wet

Tree Stratum (Plot size: 30ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Liquidambar styraciflua*	25	Yes	FAC
2. *Quercus phellos*	25	Yes	FACW
3. *Platanus occidentalis*	20	Yes	FACW
4.			
5.			
6.			
7.			
8.			
	70	=Total Cover	
50% of total cover: 35		20% of total cover:	14

Sapling/Shrub Stratum (Plot size: 15ft)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
		=Total Cover	
50% of total cover:		20% of total cover:	

Herb Stratum (Plot size: 30ft)			
1. *Microstegium vimineum*	15	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	15	=Total Cover	
50% of total cover: 8		20% of total cover:	3

Woody Vine Stratum (Plot size: 15ft)			
1.			
2.			
3.			
4.			
5.			
		=Total Cover	
50% of total cover:		20% of total cover:	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	45	x 2 =	90
FAC species	40	x 3 =	120
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	85 (A)		210 (B)

Prevalence Index = B/A = 2.47

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- X 3 - Prevalence Index is ≤3.0[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (If observed, list morphological adaptations below.)

SOIL

Sampling Point: W09 Wet

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 2/2	100					Loamy/Clayey	
3-20	10YR 4/2	90	10YR 4/6	10	C	M	Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Organic Bodies (A6) **(LRR, P, T, U)**
- ___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ___ Muck Presence (A8) **(LRR U)**
- ___ 1 cm Muck (A9) **(LRR P, T)**
- X Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Coast Prairie Redox (A16) **(MLRA 150A)**
- ___ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR P, S, T, U)**
- ___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ___ Thin Dark Surface (S9) **(LRR S, T, U)**
- ___ Barrier Islands 1 cm Muck (S12) **(MLRA 153B, 153D)**
- ___ Loamy Mucky Mineral (F1) **(LRR O)**
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) **(LRR U)**
- ___ Depleted Ochric (F11) **(MLRA 151)**
- ___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ___ Umbric Surface (F13) **(LRR P, T, U)**
- ___ Delta Ochric (F17) **(MLRA 151)**
- ___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 149A, 153C, 153D)**
- ___ Very Shallow Dark Surface (F22) **(MLRA 138, 152A in FL, 154)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR O)**
- ___ 2 cm Muck (A10) **(LRR S)**
- ___ Coast Prairie Redox (A16) **(outside MLRA 150A)**
- ___ Reduced Vertic (F18) **(outside MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(LRR P, T)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 153B)**
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22) **(outside MLRA 138, 152A in FL, 154)**
- ___ Barrier Islands Low Chroma Matrix (TS7) **(MLRA 153B, 153D)**
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:
Hydric soils are present.

U.S. Army Corps of Engineers **WETLAND DETERMINATION DATA SHEET – Atlantic and Gulf Coastal Plain Region** See ERDC/EL TR-07-24; the proponent agency is CECW-CO-R	*Requirement Control Symbol EXEMPT (Authority: AR 335-15, paragraph 5-2a)*

Project/Site: Yum Yum Solar City/County: Fayette Sampling Date: 11/14/2018

Applicant/Owner: Invenergy State: TN Sampling Point: W18 Up

Investigator(s): Michael Swenson Kelly Thames Section, Township, Range: _____

Landform (hillside, terrace, etc.): Footslope Local relief (concave, convex, none): Concave Slope (%): 5

Subregion (LRR or MLRA): LRR P, MLRA 134 Lat: 35.324490 Long: -89.411301 Datum: WGS84

Soil Map Unit Name: Grenada silt loam, terrace, 2 to 5 percent slopes, eroded NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ___ No X (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___	No X	**Is the Sampled Area within a Wetland?** **Yes** ___ **No** X
Hydric Soil Present?	Yes ___	No X	
Wetland Hydrology Present?	Yes ___	No X	

Remarks:
Upland plot is located in a forested edge adjacent to an agricultural field.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15) **(LRR U)**
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Sphagnum Moss (D8) **(LRR T,U)**

Field Observations:

Surface Water Present?	Yes ___	No ___	Depth (inches): ___
Water Table Present?	Yes ___	No ___	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No ___	Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of wetland hydrology are present.

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: W18 Up

Tree Stratum (Plot size: 30ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Quercus falcata*	30	Yes	FACU
2. *Ulmus americana*	20	Yes	FAC
3.			
4.			
5.			
6.			
7.			
8.			
	50	=Total Cover	
50% of total cover: 25		20% of total cover:	10

Sapling/Shrub Stratum (Plot size: 15ft)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
		=Total Cover	
50% of total cover:		20% of total cover:	

Herb Stratum (Plot size: 30ft)			
1. *Poa annua*	30	Yes	FACU
2. *Bromus inermis*	15	Yes	UPL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	45	=Total Cover	
50% of total cover: 23		20% of total cover:	9

Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
		=Total Cover	
50% of total cover:		20% of total cover:	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 25.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	20	x 3 =	60
FACU species	60	x 4 =	240
UPL species	15	x 5 =	75
Column Totals:	95 (A)		375 (B)

Prevalence Index = B/A = 3.95

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (If observed, list morphological adaptations below.)

SOIL

Sampling Point: W18 Up

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-8	10YR 3/2	100					Loamy/Clayey	
8-20	10YR 4/3	95	10YR 4/6	5	C	M	Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Organic Bodies (A6) **(LRR, P, T, U)**
- ___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ___ Muck Presence (A8) **(LRR U)**
- ___ 1 cm Muck (A9) **(LRR P, T)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Coast Prairie Redox (A16) **(MLRA 150A)**
- ___ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR P, S, T, U)**
- ___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ___ Thin Dark Surface (S9) **(LRR S, T, U)**
- ___ Barrier Islands 1 cm Muck (S12) **(MLRA 153B, 153D)**
- ___ Loamy Mucky Mineral (F1) **(LRR O)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) **(LRR U)**
- ___ Depleted Ochric (F11) **(MLRA 151)**
- ___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ___ Umbric Surface (F13) **(LRR P, T, U)**
- ___ Delta Ochric (F17) **(MLRA 151)**
- ___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 149A, 153C, 153D)**
- ___ Very Shallow Dark Surface (F22) **(MLRA 138, 152A in FL, 154)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR O)**
- ___ 2 cm Muck (A10) **(LRR S)**
- ___ Coast Prairie Redox (A16) **(outside MLRA 150A)**
- ___ Reduced Vertic (F18) **(outside MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(LRR P, T)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 153B)**
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22) **(outside MLRA 138, 152A in FL, 154)**
- ___ Barrier Islands Low Chroma Matrix (TS7) **(MLRA 153B, 153D)**
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

No indicators of hydric soils are present.

U.S. Army Corps of Engineers **WETLAND DETERMINATION DATA SHEET – Atlantic and Gulf Coastal Plain Region** See ERDC/EL TR-07-24; the proponent agency is CECW-CO-R	*Requirement Control Symbol EXEMPT (Authority: AR 335-15, paragraph 5-2a)*

Project/Site: Yum Yum Solar City/County: Fayette Sampling Date: 11/14/2018

Applicant/Owner: Invenergy State: TN Sampling Point: W18 Wet

Investigator(s): Michael Swenson, Katie Lueth Section, Township, Range: _____

Landform (hillside, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): 0

Subregion (LRR or MLRA): LRR P, MLRA 134 Lat: 35.324596 Long: -89.411179 Datum: WGS84

Soil Map Unit Name: Falaya silt loam NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ___	**Is the Sampled Area within a Wetland?** **Yes** X **No** ___
Hydric Soil Present?	Yes X	No ___	
Wetland Hydrology Present?	Yes X	No ___	

Remarks:
Plot is located within a saturated depression along a field edge.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15) **(LRR U)**
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- X FAC-Neutral Test (D5)
- ___ Sphagnum Moss (D8) **(LRR T,U)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes X	No ___	Depth (inches): 3
Saturation Present? (includes capillary fringe)	Yes X	No ___	Depth (inches): 0

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Wetland hydrology is present.

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: W18 Wet

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	=Total Cover		
50% of total cover:		20% of total cover:	

Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	=Total Cover		
50% of total cover:		20% of total cover:	

Herb Stratum (Plot size: 30ft)			
1. Eleocharis palustris	15	Yes	OBL
2. *Carex blanda*	10	Yes	FAC
3. *Rumex crispus*	10	Yes	FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	35 =Total Cover		
50% of total cover: 18		20% of total cover: 7	

Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
50% of total cover:		20% of total cover:	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	15	x 1 =	15
FACW species	0	x 2 =	0
FAC species	20	x 3 =	60
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	35 (A)		75 (B)

Prevalence Index = B/A = 2.14

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- X 3 - Prevalence Index is ≤3.0[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (If observed, list morphological adaptations below.)

SOIL

Sampling Point: W18 Wet

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 2/2	100					Loamy/Clayey	
4-12	10YR 4/2	90	7.5R 4/6	10	C	M	Loamy/Clayey	Prominent redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Organic Bodies (A6) **(LRR, P, T, U)**
- ___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ___ Muck Presence (A8) **(LRR U)**
- ___ 1 cm Muck (A9) **(LRR P, T)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Coast Prairie Redox (A16) **(MLRA 150A)**
- ___ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR P, S, T, U)**
- ___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ___ Thin Dark Surface (S9) **(LRR S, T, U)**
- ___ Barrier Islands 1 cm Muck (S12) **(MLRA 153B, 153D)**
- ___ Loamy Mucky Mineral (F1) **(LRR O)**
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) **(LRR U)**
- ___ Depleted Ochric (F11) **(MLRA 151)**
- ___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ___ Umbric Surface (F13) **(LRR P, T, U)**
- ___ Delta Ochric (F17) **(MLRA 151)**
- ___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 149A, 153C, 153D)**
- ___ Very Shallow Dark Surface (F22) **(MLRA 138, 152A in FL, 154)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR O)**
- ___ 2 cm Muck (A10) **(LRR S)**
- ___ Coast Prairie Redox (A16) **(outside MLRA 150A)**
- ___ Reduced Vertic (F18) **(outside MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(LRR P, T)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 153B)**
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22) **(outside MLRA 138, 152A in FL, 154)**
- ___ Barrier Islands Low Chroma Matrix (TS7) **(MLRA 153B, 153D)**
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:
Hydric soils are present.

U.S. Army Corps of Engineers **WETLAND DETERMINATION DATA SHEET – Atlantic and Gulf Coastal Plain Region** See ERDC/EL TR-07-24; the proponent agency is CECW-CO-R	*Requirement Control Symbol EXEMPT (Authority: AR 335-15, paragraph 5-2a)*

Project/Site: Yum Yum Solar City/County: Fayette Sampling Date: 1/15/2019

Applicant/Owner: Invenergy State: TN Sampling Point: W22 Up

Investigator(s): Ryan Hammons, Tara Kent Section, Township, Range: _____

Landform (hillside, terrace, etc.): Flat Local relief (concave, convex, none): None Slope (%): 0

Subregion (LRR or MLRA): LRR P, MLRA 134 Lat: 35.334629 Long: -89.383705 Datum: WGS84

Soil Map Unit Name: Falaya silt loam, local alluvium NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation X, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___	No X	**Is the Sampled Area within a Wetland?** **Yes** ___ **No** X
Hydric Soil Present?	Yes ___	No X	
Wetland Hydrology Present?	Yes ___	No X	

Remarks:
Upland plot is located within an agricultural field. Plot is applicable to the following additional wetlands - W15, W31, and W45.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15) **(LRR U)**
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Sphagnum Moss (D8) **(LRR T,U)**

Field Observations:

Surface Water Present?	Yes ___	No ___	Depth (inches): ___
Water Table Present?	Yes ___	No ___	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No ___	Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of wetland hydrology are present.

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: W22 Up

Tree Stratum (Plot size: 30ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
		=Total Cover	
50% of total cover:		20% of total cover:	

Sapling/Shrub Stratum (Plot size: 15ft)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
		=Total Cover	
50% of total cover:		20% of total cover:	

Herb Stratum (Plot size: 30ft)			
1. *Poa pratensis*	65	Yes	FAC
2. *Gossypium hirsutum*	20	Yes	FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	85	=Total Cover	
50% of total cover: 43		20% of total cover: 17	

Woody Vine Stratum (Plot size: 15ft)			
1.			
2.			
3.			
4.			
5.			
		=Total Cover	
50% of total cover:		20% of total cover:	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	65	x 3 =	195
FACU species	20	x 4 =	80
UPL species	0	x 5 =	0
Column Totals:	85 (A)		275 (B)

Prevalence Index = B/A = 3.24

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (If observed, list morphological adaptations below.)
Fallow ag. Cotton field; short poa sp., rosettes.

SOIL

Sampling Point: W22 Up

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-2	10YR 4/3	100					Loamy/Clayey	
2-8	10YR 4/4	95	7.5YR 4/6	5	C	M	Loamy/Clayey	Distinct redox concentrations
8-12	10YR 5/4	10	7.5YR 5/8	20	C	M	Loamy/Clayey	Prominent redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ Organic Bodies (A6) **(LRR, P, T, U)**
___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
___ Muck Presence (A8) **(LRR U)**
___ 1 cm Muck (A9) **(LRR P, T)**
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Coast Prairie Redox (A16) **(MLRA 150A)**
___ Sandy Mucky Mineral (S1) **(LRR O, S)**
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7) **(LRR P, S, T, U)**
___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
___ Thin Dark Surface (S9) **(LRR S, T, U)**
___ Barrier Islands 1 cm Muck (S12) **(MLRA 153B, 153D)**
___ Loamy Mucky Mineral (F1) **(LRR O)**
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Marl (F10) **(LRR U)**
___ Depleted Ochric (F11) **(MLRA 151)**
___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
___ Umbric Surface (F13) **(LRR P, T, U)**
___ Delta Ochric (F17) **(MLRA 151)**
___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
___ Anomalous Bright Floodplain Soils (F20) **(MLRA 149A, 153C, 153D)**
___ Very Shallow Dark Surface (F22) **(MLRA 138, 152A in FL, 154)**

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) **(LRR O)**
___ 2 cm Muck (A10) **(LRR S)**
___ Coast Prairie Redox (A16) **(outside MLRA 150A)**
___ Reduced Vertic (F18) **(outside MLRA 150A, 150B)**
___ Piedmont Floodplain Soils (F19) **(LRR P, T)**
___ Anomalous Bright Floodplain Soils (F20) **(MLRA 153B)**
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (F22) **(outside MLRA 138, 152A in FL, 154)**
___ Barrier Islands Low Chroma Matrix (TS7) **(MLRA 153B, 153D)**
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:
No indicators of hydric soils are present.

U.S. Army Corps of Engineers **WETLAND DETERMINATION DATA SHEET – Atlantic and Gulf Coastal Plain Region** See ERDC/EL TR-07-24; the proponent agency is CECW-CO-R	*Requirement Control Symbol EXEMPT (Authority: AR 335-15, paragraph 5-2a)*

Project/Site: Yum Yum Solar City/County: Fayette Sampling Date: 1/15/2019

Applicant/Owner: Invenergy State: TN Sampling Point: W22 Wet

Investigator(s): Ryan Hammons, Tara Kent Section, Township, Range: _____

Landform (hillside, terrace, etc.): Hillslope Local relief (concave, convex, none): None Slope (%): 0

Subregion (LRR or MLRA): LRR P, MLRA 134 Lat: 35.334724 Long: -89.383766 Datum: WGS84

Soil Map Unit Name: Falaya silt loam, local alluvium NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ___	**Is the Sampled Area within a Wetland?** **Yes** X **No** ___
Hydric Soil Present?	Yes X	No ___	
Wetland Hydrology Present?	Yes X	No ___	

Remarks:
Plot is located within a PEM wetland surrounded by agricultural field. Wetland is connected to a perennial stream via a grassed drainage. Plot is applicable to the following additional wetlands - W15, W31, and W45.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15) **(LRR U)**
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- X Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- X FAC-Neutral Test (D5)
- ___ Sphagnum Moss (D8) **(LRR T,U)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes X	No ___	Depth (inches): 3
Saturation Present? (includes capillary fringe)	Yes X	No ___	Depth (inches): 0

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Wetland hydrology is present.

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: W22 Wet

Tree Stratum (Plot size: 30ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
		=Total Cover	
50% of total cover:		20% of total cover:	

Sapling/Shrub Stratum (Plot size: 15ft)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
		=Total Cover	
50% of total cover:		20% of total cover:	

Herb Stratum (Plot size: 30ft)			
1. *Ambrosia trifida*	20	Yes	FAC
2. *Phragmites australis*	10	Yes	FACW
3. *Sorghum halepense*	5	No	FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	35	=Total Cover	
50% of total cover: 18		20% of total cover:	7

Woody Vine Stratum (Plot size: 5ft)			
1.			
2.			
3.			
4.			
5.			
		=Total Cover	
50% of total cover:		20% of total cover:	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	10	x 2 =	20
FAC species	20	x 3 =	60
FACU species	5	x 4 =	20
UPL species	0	x 5 =	0
Column Totals:	35 (A)		100 (B)

Prevalence Index = B/A = 2.86

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- X 3 - Prevalence Index is ≤3.0[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (If observed, list morphological adaptations below.)

SOIL

Sampling Point: W22 Wet

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 5/2	50	7.5YR 5/8	50	C	M	Loamy/Clayey	Prominent redox concentrations
6-8	5YR 5/2	15	7.5YR 5/8	30	C	M	Loamy/Clayey	Prominent redox concentrations
8-12	10YR 5/2	50	5YR 3/4	20	C	M	Loamy/Clayey	Prominent redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Organic Bodies (A6) **(LRR, P, T, U)**
- ___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ___ Muck Presence (A8) **(LRR U)**
- ___ 1 cm Muck (A9) **(LRR P, T)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Coast Prairie Redox (A16) **(MLRA 150A)**
- ___ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR P, S, T, U)**
- ___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ___ Thin Dark Surface (S9) **(LRR S, T, U)**
- ___ Barrier Islands 1 cm Muck (S12) **(MLRA 153B, 153D)**
- ___ Loamy Mucky Mineral (F1) **(LRR O)**
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) **(LRR U)**
- ___ Depleted Ochric (F11) **(MLRA 151)**
- ___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ___ Umbric Surface (F13) **(LRR P, T, U)**
- ___ Delta Ochric (F17) **(MLRA 151)**
- ___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 149A, 153C, 153D)**
- ___ Very Shallow Dark Surface (F22) **(MLRA 138, 152A in FL, 154)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR O)**
- ___ 2 cm Muck (A10) **(LRR S)**
- X Coast Prairie Redox (A16) **(outside MLRA 150A)**
- ___ Reduced Vertic (F18) **(outside MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(LRR P, T)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 153B)**
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22) **(outside MLRA 138, 152A in FL, 154)**
- ___ Barrier Islands Low Chroma Matrix (TS7) **(MLRA 153B, 153D)**
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:
Hydric soils are present.

U.S. Army Corps of Engineers **WETLAND DETERMINATION DATA SHEET – Atlantic and Gulf Coastal Plain Region** See ERDC/EL TR-07-24; the proponent agency is CECW-CO-R	*Requirement Control Symbol EXEMPT (Authority: AR 335-15, paragraph 5-2a)*

Project/Site: Yum Yum Solar City/County: Fayette Sampling Date: 1/15/2019

Applicant/Owner: Invenergy State: TN Sampling Point: W26 Up

Investigator(s): Michael Swenson, Katie Lueth Section, Township, Range: _____

Landform (hillside, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): 3

Subregion (LRR or MLRA): LRR P, MLRA 134 Lat: 35.336407 Long: -89.364807 Datum: WGS84

Soil Map Unit Name: Calloway silt loam, 0 to 2 percent slopes NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___	No X	**Is the Sampled Area within a Wetland?** **Yes** X **No** ___
Hydric Soil Present?	Yes ___	No X	
Wetland Hydrology Present?	Yes ___	No X	

Remarks:
Upland plot is located within a wooded field edge adjacent to a PFO wetland.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15) **(LRR U)**
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Sphagnum Moss (D8) **(LRR T,U)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Wetland hydrology is not present.

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: W26 Up

Tree Stratum (Plot size: 30ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Quercus rubra*	20	Yes	FACU
2. *Liquidambar styraciflua*	15	Yes	FAC
3.			
4.			
5.			
6.			
7.			
8.			
	35	=Total Cover	
50% of total cover: 18		20% of total cover: 7	

Sapling/Shrub Stratum (Plot size: 15ft)			
1. *Lonicera japonica*	20	Yes	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	20	=Total Cover	
50% of total cover: 10		20% of total cover: 4	

Herb Stratum (Plot size: 30ft)			
1. *Poa annua*	25	Yes	FACU
2. *Microstegium vimineum*	20	Yes	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	45	=Total Cover	
50% of total cover: 23		20% of total cover: 9	

Woody Vine Stratum (Plot size: 15ft)			
1. *Smilax rotundifolia*	20	Yes	FAC
2.			
3.			
4.			
5.			
	20	=Total Cover	
50% of total cover: 10		20% of total cover: 4	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	55	x 3 =	165
FACU species	65	x 4 =	260
UPL species	0	x 5 =	0
Column Totals:	120 (A)		425 (B)

Prevalence Index = B/A = 3.54

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (If observed, list morphological adaptations below.)

SOIL

Sampling Point: W26 Up

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-8	10YR 2/2	100					Loamy/Clayey	
8-20	10YR 4/3	95	10YR 4/6	5	C	M	Loamy/Clayey	Distinct redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Organic Bodies (A6) **(LRR, P, T, U)**
- ___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ___ Muck Presence (A8) **(LRR U)**
- ___ 1 cm Muck (A9) **(LRR P, T)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Coast Prairie Redox (A16) **(MLRA 150A)**
- ___ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR P, S, T, U)**
- ___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ___ Thin Dark Surface (S9) **(LRR S, T, U)**
- ___ Barrier Islands 1 cm Muck (S12) **(MLRA 153B, 153D)**
- ___ Loamy Mucky Mineral (F1) **(LRR O)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) **(LRR U)**
- ___ Depleted Ochric (F11) **(MLRA 151)**
- ___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ___ Umbric Surface (F13) **(LRR P, T, U)**
- ___ Delta Ochric (F17) **(MLRA 151)**
- ___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 149A, 153C, 153D)**
- ___ Very Shallow Dark Surface (F22) **(MLRA 138, 152A in FL, 154)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR O)**
- ___ 2 cm Muck (A10) **(LRR S)**
- ___ Coast Prairie Redox (A16) **(outside MLRA 150A)**
- ___ Reduced Vertic (F18) **(outside MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(LRR P, T)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 153B)**
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22) **(outside MLRA 138, 152A in FL, 154)**
- ___ Barrier Islands Low Chroma Matrix (TS7) **(MLRA 153B, 153D)**
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

Indicators of hydric soils are not present.

U.S. Army Corps of Engineers **WETLAND DETERMINATION DATA SHEET – Atlantic and Gulf Coastal Plain Region** See ERDC/EL TR-07-24; the proponent agency is CECW-CO-R	*Requirement Control Symbol* *EXEMPT* *(Authority: AR 335-15, paragraph 5-2a)*

Project/Site: Yum Yum Solar City/County: Fayette Sampling Date: 1/15/2019

Applicant/Owner: Invenergy State: TN Sampling Point: W26 Wet

Investigator(s): Michael Swenson, Katie Lueth Section, Township, Range: _____

Landform (hillside, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): 2

Subregion (LRR or MLRA): LRR P, MLRA 134 Lat: 35.336468 Long: -89.364784 Datum: WGS84

Soil Map Unit Name: Calloway silt loam, 0 to 2 percent slopes NWI classification: PFO

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ___	**Is the Sampled Area within a Wetland?** **Yes** X **No** ___
Hydric Soil Present?	Yes X	No ___	
Wetland Hydrology Present?	Yes X	No ___	

Remarks:
Plot is located within a stand of flooded trees near the field edge.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- X Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15) **(LRR U)**
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- X FAC-Neutral Test (D5)
- ___ Sphagnum Moss (D8) **(LRR T,U)**

Field Observations:

Surface Water Present?	Yes X	No ___	Depth (inches): 2
Water Table Present?	Yes X	No ___	Depth (inches): 0
Saturation Present? (includes capillary fringe)	Yes X	No ___	Depth (inches): 0

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Wetland hydrology is present.

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: W26 Wet

Tree Stratum (Plot size: 30ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Liquidambar styraciflua*	35	Yes	FAC
2. *Quercus phellos*	20	Yes	FACW
3.			
4.			
5.			
6.			
7.			
8.			
	55	=Total Cover	
50% of total cover: 28		20% of total cover:	11

Sapling/Shrub Stratum (Plot size: 15ft)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
		=Total Cover	
50% of total cover:		20% of total cover:	

Herb Stratum (Plot size: 30ft)			
1. *Microstegium vimineum*	15	Yes	FAC
2. *Carex stricta*	10	Yes	OBL
3. *Phalaris arundinacea*	10	Yes	OBL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	35	=Total Cover	
50% of total cover: 18		20% of total cover:	7

Woody Vine Stratum (Plot size: 15ft)			
1. *Smilax rotundifolia*	20	Yes	FAC
2.			
3.			
4.			
5.			
	20	=Total Cover	
50% of total cover: 10		20% of total cover:	4

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 6 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	20	x 1 =	20
FACW species	20	x 2 =	40
FAC species	70	x 3 =	210
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	110 (A)		270 (B)

Prevalence Index = B/A = 2.45

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- X 3 - Prevalence Index is ≤3.0[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (If observed, list morphological adaptations below.)

SOIL

Sampling Point: W26 Wet

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 2/2	100					Loamy/Clayey	
3-18	10YR 4/2	90	10YR 4/6	10	C	M	Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Organic Bodies (A6) **(LRR, P, T, U)**
- ___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ___ Muck Presence (A8) **(LRR U)**
- ___ 1 cm Muck (A9) **(LRR P, T)**
- X Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Coast Prairie Redox (A16) **(MLRA 150A)**
- ___ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR P, S, T, U)**
- ___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ___ Thin Dark Surface (S9) **(LRR S, T, U)**
- ___ Barrier Islands 1 cm Muck (S12) **(MLRA 153B, 153D)**
- ___ Loamy Mucky Mineral (F1) **(LRR O)**
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) **(LRR U)**
- ___ Depleted Ochric (F11) **(MLRA 151)**
- ___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ___ Umbric Surface (F13) **(LRR P, T, U)**
- ___ Delta Ochric (F17) **(MLRA 151)**
- ___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 149A, 153C, 153D)**
- ___ Very Shallow Dark Surface (F22) **(MLRA 138, 152A in FL, 154)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR O)**
- ___ 2 cm Muck (A10) **(LRR S)**
- ___ Coast Prairie Redox (A16) **(outside MLRA 150A)**
- ___ Reduced Vertic (F18) **(outside MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(LRR P, T)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 153B)**
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22) **(outside MLRA 138, 152A in FL, 154)**
- ___ Barrier Islands Low Chroma Matrix (TS7) **(MLRA 153B, 153D)**
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:
Hydric soils are present.

U.S. Army Corps of Engineers **WETLAND DETERMINATION DATA SHEET – Atlantic and Gulf Coastal Plain Region** See ERDC/EL TR-07-24; the proponent agency is CECW-CO-R	*Requirement Control Symbol EXEMPT (Authority: AR 335-15, paragraph 5-2a)*

Project/Site: Yum Yum Solar City/County: Fayette Sampling Date: 1/15/2019

Applicant/Owner: Invenergy State: TN Sampling Point: W27 Up

Investigator(s): Michael Swenson, Katie Lueth Section, Township, Range: _____

Landform (hillside, terrace, etc.): Shoulder Local relief (concave, convex, none): Concave Slope (%): 3

Subregion (LRR or MLRA): LRR P, MLRA 134 Lat: 35.335285 Long: -89.370392 Datum: WGS84

Soil Map Unit Name: Grenada silt loam, terrace, 2 to 5 percent slopes, eroded NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
Upland plot is located within a wooded area adjacent to a PFO wetland. Hydrophytic vegetation is present in the form of FAC dominant species. No indicators of hydric soils or wetland hydrology are present. Therefore, the area is not wetland.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15) **(LRR U)**
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Sphagnum Moss (D8) **(LRR T,U)**

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of wetland hydrology are present.

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: W27 Up

Tree Stratum (Plot size: 30ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Quercus alba*	25	Yes	FACU
2. *Quercus rubra*	20	Yes	FACU
3.			
4.			
5.			
6.			
7.			
8.			
	45	=Total Cover	
50% of total cover: 23		20% of total cover: 9	

Sapling/Shrub Stratum (Plot size: 15ft)			
1. *Lonicera japonica*	15	Yes	FACW
2. *Ligustrum japonicum*	10	Yes	FAC
3.			
4.			
5.			
6.			
7.			
8.			
	25	=Total Cover	
50% of total cover: 13		20% of total cover: 5	

Herb Stratum (Plot size: 30ft)			
1. *Poa annua*	20	Yes	FACU
2. *Microstegium vimineum*	10	Yes	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	30	=Total Cover	
50% of total cover: 15		20% of total cover: 6	

Woody Vine Stratum (Plot size: 15ft)			
1. *Smilax rotundifolia*	25	Yes	FAC
2.			
3.			
4.			
5.			
	25	=Total Cover	
50% of total cover: 13		20% of total cover: 5	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 57.1% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	15	x 2 =	30
FAC species	45	x 3 =	135
FACU species	65	x 4 =	260
UPL species	0	x 5 =	0
Column Totals:	125 (A)		425 (B)

Prevalence Index = B/A = 3.40

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (If observed, list morphological adaptations below.)

SOIL

Sampling Point: W27 Up

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-8	10YR 3/2	100					Loamy/Clayey	
8-20	10YR 4/3	90	10YR 4/6	10	C	M	Loamy/Clayey	Distinct redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Organic Bodies (A6) **(LRR, P, T, U)**
- ___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ___ Muck Presence (A8) **(LRR U)**
- ___ 1 cm Muck (A9) **(LRR P, T)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Coast Prairie Redox (A16) **(MLRA 150A)**
- ___ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR P, S, T, U)**
- ___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ___ Thin Dark Surface (S9) **(LRR S, T, U)**
- ___ Barrier Islands 1 cm Muck (S12) **(MLRA 153B, 153D)**
- ___ Loamy Mucky Mineral (F1) **(LRR O)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) **(LRR U)**
- ___ Depleted Ochric (F11) **(MLRA 151)**
- ___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ___ Umbric Surface (F13) **(LRR P, T, U)**
- ___ Delta Ochric (F17) **(MLRA 151)**
- ___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 149A, 153C, 153D)**
- ___ Very Shallow Dark Surface (F22) **(MLRA 138, 152A in FL, 154)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR O)**
- ___ 2 cm Muck (A10) **(LRR S)**
- ___ Coast Prairie Redox (A16) **(outside MLRA 150A)**
- ___ Reduced Vertic (F18) **(outside MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(LRR P, T)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 153B)**
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22) **(outside MLRA 138, 152A in FL, 154)**
- ___ Barrier Islands Low Chroma Matrix (TS7) **(MLRA 153B, 153D)**
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

No indicators of hydric soils are present.

U.S. Army Corps of Engineers **WETLAND DETERMINATION DATA SHEET – Atlantic and Gulf Coastal Plain Region** See ERDC/EL TR-07-24; the proponent agency is CECW-CO-R	*Requirement Control Symbol* *EXEMPT* *(Authority: AR 335-15, paragraph 5-2a)*

Project/Site: Yum Yum Solar City/County: Fayette Sampling Date: 1/14/2019

Applicant/Owner: Invenergy State: TN Sampling Point: W38 Wet

Investigator(s): Michael Swenson, Katie Lueth Section, Township, Range: _____

Landform (hillside, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): 1

Subregion (LRR or MLRA): LRR P, MLRA 134 Lat: 35.324749 Long: -89.451576 Datum: WGS84

Soil Map Unit Name: Waverly silt loam, 0 to 2 percent slopes, frequently flooded, long duration NWI classification: PFO

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ___	**Is the Sampled Area within a Wetland?** **Yes** X **No** ___
Hydric Soil Present?	Yes X	No ___	
Wetland Hydrology Present?	Yes X	No ___	

Remarks:
Plot is located within a PFO wetland. Plot is applicable to the following additional wetlands - W41, W42, W43, and W44.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- X Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- X Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15) **(LRR U)**
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- X FAC-Neutral Test (D5)
- ___ Sphagnum Moss (D8) **(LRR T,U)**

Field Observations:

Surface Water Present?	Yes X	No ___	Depth (inches): 2
Water Table Present?	Yes X	No ___	Depth (inches): 0
Saturation Present? (includes capillary fringe)	Yes X	No ___	Depth (inches): 0

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Wetland hydrology is present.

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: W38 Wet

Tree Stratum (Plot size: 30ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Liquidambar styraciflua*	25	Yes	FAC
2. *Ulmus americana*	20	Yes	FAC
3. *Platanus occidentalis*	20	Yes	FACW
4.			
5.			
6.			
7.			
8.			
	65	=Total Cover	
50% of total cover: 33		20% of total cover:	13

Sapling/Shrub Stratum (Plot size: 30ft)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
		=Total Cover	
50% of total cover:		20% of total cover:	

Herb Stratum (Plot size: 5ft)			
1. *Carex stricta*	20	Yes	OBL
2. *Phalaris arundinacea*	10	Yes	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	30	=Total Cover	
50% of total cover: 15		20% of total cover:	6

Woody Vine Stratum (Plot size: 15ft)			
1. *Smilax rotundifolia*	20	Yes	FAC
2.			
3.			
4.			
5.			
	20	=Total Cover	
50% of total cover: 10		20% of total cover:	4

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 6 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	30	x 1 =	30
FACW species	20	x 2 =	40
FAC species	65	x 3 =	195
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	115 (A)		265 (B)

Prevalence Index = B/A = 2.30

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- X 3 - Prevalence Index is ≤3.0[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (If observed, list morphological adaptations below.)

SOIL

Sampling Point: W38 Wet

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-10	10YR 4/2	80	10YR 4/6	20	C	M	Loamy/Clayey	Prominent redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Organic Bodies (A6) **(LRR, P, T, U)**
- ___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ___ Muck Presence (A8) **(LRR U)**
- ___ 1 cm Muck (A9) **(LRR P, T)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Coast Prairie Redox (A16) **(MLRA 150A)**
- ___ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR P, S, T, U)**
- ___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ___ Thin Dark Surface (S9) **(LRR S, T, U)**
- ___ Barrier Islands 1 cm Muck (S12) **(MLRA 153B, 153D)**
- ___ Loamy Mucky Mineral (F1) **(LRR O)**
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) **(LRR U)**
- ___ Depleted Ochric (F11) **(MLRA 151)**
- ___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ___ Umbric Surface (F13) **(LRR P, T, U)**
- ___ Delta Ochric (F17) **(MLRA 151)**
- ___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 149A, 153C, 153D)**
- ___ Very Shallow Dark Surface (F22) **(MLRA 138, 152A in FL, 154)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR O)**
- ___ 2 cm Muck (A10) **(LRR S)**
- ___ Coast Prairie Redox (A16) **(outside MLRA 150A)**
- ___ Reduced Vertic (F18) **(outside MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(LRR P, T)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 153B)**
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22) **(outside MLRA 138, 152A in FL, 154)**
- ___ Barrier Islands Low Chroma Matrix (TS7) **(MLRA 153B, 153D)**
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

Hydric soils are present. Sample only taken to 10" due to water in profile.

U.S. Army Corps of Engineers **WETLAND DETERMINATION DATA SHEET – Atlantic and Gulf Coastal Plain Region** See ERDC/EL TR-07-24; the proponent agency is CECW-CO-R	*Requirement Control Symbol EXEMPT (Authority: AR 335-15, paragraph 5-2a)*

Project/Site: Yum Yum Soalr City/County: Fayette Sampling Date: 1/15/2019

Applicant/Owner: Invenergy State: TN Sampling Point: W27 Wet

Investigator(s): Michael Swenson, Katie Lueth Section, Township, Range: _____

Landform (hillside, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): 3

Subregion (LRR or MLRA): LRR P, MLRA 134 Lat: 35.335293 Long: -89.370537 Datum: WGS84

Soil Map Unit Name: Henry silt loam NWI classification: PFO

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ___	**Is the Sampled Area within a Wetland?** **Yes** X **No** ___
Hydric Soil Present?	Yes X	No ___	
Wetland Hydrology Present?	Yes X	No ___	

Remarks:
Plot is located within PFO wetland area.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15) **(LRR U)**
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- X FAC-Neutral Test (D5)
- ___ Sphagnum Moss (D8) **(LRR T,U)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes X	No ___	Depth (inches): 4

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Wetland hydrology is present.

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: W27 Wet

Tree Stratum (Plot size: 30ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Liquidambar styraciflua*	25	Yes	FAC
2. *Platanus occidentalis*	25	Yes	FACW
3. *Quercus macrocarpa*	20	Yes	FAC
4.			
5.			
6.			
7.			
8.			
	70	=Total Cover	
50% of total cover: 35		20% of total cover:	14

Sapling/Shrub Stratum (Plot size: 15ft)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
		=Total Cover	
50% of total cover:		20% of total cover:	

Herb Stratum (Plot size: 30ft)			
1. *Microstegium vimineum*	20	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	20	=Total Cover	
50% of total cover: 10		20% of total cover:	4

Woody Vine Stratum (Plot size: 15ft)			
1.			
2.			
3.			
4.			
5.			
		=Total Cover	
50% of total cover:		20% of total cover:	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	25	x 2 =	50
FAC species	65	x 3 =	195
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	90 (A)		245 (B)

Prevalence Index = B/A = 2.72

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- X 3 - Prevalence Index is ≤3.0[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (If observed, list morphological adaptations below.)

SOIL

Sampling Point: W27 Wet

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 4/2	90	10YR 4/6	10	C	M	Loamy/Clayey	Prominent redox concentrations
3-18	10YR 6/2	90	10YR 4/6	10	C	M	Loamy/Clayey	Prominent redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Organic Bodies (A6) **(LRR, P, T, U)**
- ___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ___ Muck Presence (A8) **(LRR U)**
- ___ 1 cm Muck (A9) **(LRR P, T)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Coast Prairie Redox (A16) **(MLRA 150A)**
- ___ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR P, S, T, U)**
- ___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ___ Thin Dark Surface (S9) **(LRR S, T, U)**
- ___ Barrier Islands 1 cm Muck (S12) **(MLRA 153B, 153D)**
- ___ Loamy Mucky Mineral (F1) **(LRR O)**
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) **(LRR U)**
- ___ Depleted Ochric (F11) **(MLRA 151)**
- ___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ___ Umbric Surface (F13) **(LRR P, T, U)**
- ___ Delta Ochric (F17) **(MLRA 151)**
- ___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 149A, 153C, 153D)**
- ___ Very Shallow Dark Surface (F22) **(MLRA 138, 152A in FL, 154)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR O)**
- ___ 2 cm Muck (A10) **(LRR S)**
- ___ Coast Prairie Redox (A16) **(outside MLRA 150A)**
- ___ Reduced Vertic (F18) **(outside MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(LRR P, T)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 153B)**
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22) **(outside MLRA 138, 152A in FL, 154)**
- ___ Barrier Islands Low Chroma Matrix (TS7) **(MLRA 153B, 153D)**
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:
Hydric soils are present.

U.S. Army Corps of Engineers **WETLAND DETERMINATION DATA SHEET – Atlantic and Gulf Coastal Plain Region** See ERDC/EL TR-07-24; the proponent agency is CECW-CO-R	*Requirement Control Symbol EXEMPT (Authority: AR 335-15, paragraph 5-2a)*

Project/Site: Yum Yum Solar City/County: Fayette Sampling Date: 1/15/2019

Applicant/Owner: Invenergy State: TN Sampling Point: W28 Up

Investigator(s): Michael Swenson, Katie Lueth Section, Township, Range: _____

Landform (hillside, terrace, etc.): Basin Local relief (concave, convex, none): Concave Slope (%): 3

Subregion (LRR or MLRA): LRR P, MLRA 134 Lat: 35.329124 Long: -89.375755 Datum: WGS84

Soil Map Unit Name: Falaya silt loam, local alluvium NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ___	**Is the Sampled Area within a Wetland?** **Yes** ___ **No** X
Hydric Soil Present?	Yes ___	No X	
Wetland Hydrology Present?	Yes ___	No X	

Remarks:
Upland plot is located within a forested field edge adjacent to a forested wetland. Hydrophytic vegetation is present in the form of FAC dominant species. Plot was considered non wetland based on the lack of hydric indicators and wetland hydrology indicators.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15) **(LRR U)**
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Sphagnum Moss (D8) **(LRR T,U)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of wetland hydrology are present.

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: W28 Up

Tree Stratum (Plot size: 30ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Quercus falcata*	25	Yes	FACU
2. *Liquidambar styraciflua*	10	Yes	FAC
3. *Ulmus americana*	10	Yes	FAC
4. *Quercus phellos*	10	Yes	FACW
5.			
6.			
7.			
8.			
	55	=Total Cover	
50% of total cover: 28		20% of total cover:	11

Sapling/Shrub Stratum (Plot size: 15ft)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
		=Total Cover	
50% of total cover:		20% of total cover:	

Herb Stratum (Plot size: 30ft)			
1. *Poa palustris*	25	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	25	=Total Cover	
50% of total cover: 13		20% of total cover:	5

Woody Vine Stratum (Plot size: 15ft)			
1.			
2.			
3.			
4.			
5.			
		=Total Cover	
50% of total cover:		20% of total cover:	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 80.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	10	x 2 =	20
FAC species	45	x 3 =	135
FACU species	25	x 4 =	100
UPL species	0	x 5 =	0
Column Totals:	80 (A)		255 (B)

Prevalence Index = B/A = 3.19

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (If observed, list morphological adaptations below.)

SOIL

Sampling Point: W28 Up

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 4/3	100					Loamy/Clayey	
4-16	10YR 5/6	100					Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Organic Bodies (A6) **(LRR, P, T, U)**
- ___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ___ Muck Presence (A8) **(LRR U)**
- ___ 1 cm Muck (A9) **(LRR P, T)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Coast Prairie Redox (A16) **(MLRA 150A)**
- ___ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR P, S, T, U)**
- ___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ___ Thin Dark Surface (S9) **(LRR S, T, U)**
- ___ Barrier Islands 1 cm Muck (S12) **(MLRA 153B, 153D)**
- ___ Loamy Mucky Mineral (F1) **(LRR O)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) **(LRR U)**
- ___ Depleted Ochric (F11) **(MLRA 151)**
- ___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ___ Umbric Surface (F13) **(LRR P, T, U)**
- ___ Delta Ochric (F17) **(MLRA 151)**
- ___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 149A, 153C, 153D)**
- ___ Very Shallow Dark Surface (F22) **(MLRA 138, 152A in FL, 154)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR O)**
- ___ 2 cm Muck (A10) **(LRR S)**
- ___ Coast Prairie Redox (A16) **(outside MLRA 150A)**
- ___ Reduced Vertic (F18) **(outside MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(LRR P, T)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 153B)**
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22) **(outside MLRA 138, 152A in FL, 154)**
- ___ Barrier Islands Low Chroma Matrix (TS7) **(MLRA 153B, 153D)**
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

No indicators of hydric soil are present.

U.S. Army Corps of Engineers **WETLAND DETERMINATION DATA SHEET – Atlantic and Gulf Coastal Plain Region** See ERDC/EL TR-07-24; the proponent agency is CECW-CO-R	*Requirement Control Symbol EXEMPT (Authority: AR 335-15, paragraph 5-2a)*

Project/Site: Yum Yum Solar City/County: Fayette Sampling Date: 1/15/2019

Applicant/Owner: Invenergy State: TN Sampling Point: W28 Wet

Investigator(s): Michael Swenson, Katie Lueth Section, Township, Range: _____

Landform (hillside, terrace, etc.): Channel Local relief (concave, convex, none): Concave Slope (%): 2

Subregion (LRR or MLRA): LRR P, MLRA 134 Lat: 35.329201 Long: -89.375801 Datum: WGS84

Soil Map Unit Name: Falaya silt loam, local alluvium NWI classification: PFO

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ___	**Is the Sampled Area within a Wetland?** **Yes** X **No** ___
Hydric Soil Present?	Yes X	No ___	
Wetland Hydrology Present?	Yes X	No ___	

Remarks:
Plot is located within a PFO wetland. A drainage swale flows through the wetland area. Plot is applicable to the following wetlands - W23, W29, and W30.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- X Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15) **(LRR U)**
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- X FAC-Neutral Test (D5)
- ___ Sphagnum Moss (D8) **(LRR T,U)**

Field Observations:

Surface Water Present?	Yes X	No ___	Depth (inches): 2
Water Table Present?	Yes X	No ___	Depth (inches): 0
Saturation Present? (includes capillary fringe)	Yes X	No ___	Depth (inches): 0

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Wetland hydrology is present.

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: W28 Wet

Tree Stratum (Plot size: 30ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Plantus occidentalis*	30	Yes	FACW
2. *Liquidambar styraciflua*	25	Yes	FAC
3. *Quercus phellos*	15	Yes	FACW
4.			
5.			
6.			
7.			
8.			
	70	=Total Cover	
50% of total cover: 35		20% of total cover:	14

Sapling/Shrub Stratum (Plot size: 15ft)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
		=Total Cover	
50% of total cover:		20% of total cover:	

Herb Stratum (Plot size: 30ft)			
1. *Microstegium vimineum*	15	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	15	=Total Cover	
50% of total cover: 8		20% of total cover:	3

Woody Vine Stratum (Plot size: 15ft)			
1.			
2.			
3.			
4.			
5.			
		=Total Cover	
50% of total cover:		20% of total cover:	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	45	x 2 =	90
FAC species	40	x 3 =	120
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	85 (A)		210 (B)

Prevalence Index = B/A = 2.47

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- X 3 - Prevalence Index is ≤3.0[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (If observed, list morphological adaptations below.)

SOIL

Sampling Point: W28 Wet

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 2/2	100					Loamy/Clayey	
3-6	10YR 5/2	95	7.5R 4/6	5	C	M	Loamy/Clayey	
6-18	10YR 5/2	80	10YR 4/6	20	C	M	Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Organic Bodies (A6) **(LRR, P, T, U)**
- ___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ___ Muck Presence (A8) **(LRR U)**
- ___ 1 cm Muck (A9) **(LRR P, T)**
- X Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Coast Prairie Redox (A16) **(MLRA 150A)**
- ___ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR P, S, T, U)**
- ___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ___ Thin Dark Surface (S9) **(LRR S, T, U)**
- ___ Barrier Islands 1 cm Muck (S12) **(MLRA 153B, 153D)**
- ___ Loamy Mucky Mineral (F1) **(LRR O)**
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) **(LRR U)**
- ___ Depleted Ochric (F11) **(MLRA 151)**
- ___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ___ Umbric Surface (F13) **(LRR P, T, U)**
- ___ Delta Ochric (F17) **(MLRA 151)**
- ___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 149A, 153C, 153D)**
- ___ Very Shallow Dark Surface (F22) **(MLRA 138, 152A in FL, 154)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR O)**
- ___ 2 cm Muck (A10) **(LRR S)**
- ___ Coast Prairie Redox (A16) **(outside MLRA 150A)**
- ___ Reduced Vertic (F18) **(outside MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(LRR P, T)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 153B)**
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22) **(outside MLRA 138, 152A in FL, 154)**
- ___ Barrier Islands Low Chroma Matrix (TS7) **(MLRA 153B, 153D)**
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:
Hydric soils are present.

U.S. Army Corps of Engineers **WETLAND DETERMINATION DATA SHEET – Atlantic and Gulf Coastal Plain Region** See ERDC/EL TR-07-24; the proponent agency is CECW-CO-R	*Requirement Control Symbol EXEMPT (Authority: AR 335-15, paragraph 5-2a)*

Project/Site: Yum Yum Solar City/County: Fayette Sampling Date: 1/16/2019

Applicant/Owner: Invenergy State: TN Sampling Point: W32 Up

Investigator(s): Ryan Hammons, Tara Kent Section, Township, Range: _____

Landform (hillside, terrace, etc.): Depression Local relief (concave, convex, none): Convex Slope (%): 0

Subregion (LRR or MLRA): LRR P, MLRA 134 Lat: 35.305470 Long: -89.392502 Datum: WGS84

Soil Map Unit Name: Henry silt loam NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
Upland plot is located along a forested field edge. Hydrophytic vegetation is present in the form of FAC dominant species. Although hydrophytic vegetation is present, no indicators of hydric soils nor wetland hydrology are present. Therefore the area is not wetland.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15) **(LRR U)**
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Sphagnum Moss (D8) **(LRR T,U)**

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No ____	Depth (inches): ____

Wetland Hydrology Present? **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of wetland hydrology are present.

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: W32 Up

Tree Stratum (Plot size: 30ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Quercus alba*	20	Yes	FACU
2. *Liquidambar styraciflua*	10	Yes	FAC
3.			
4.			
5.			
6.			
7.			
8.			
	30	=Total Cover	
50% of total cover: 15		20% of total cover:	6

Sapling/Shrub Stratum (Plot size: 15ft)			
1. *Smilax bona-nox*	15	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	15	=Total Cover	
50% of total cover: 8		20% of total cover:	3

Herb Stratum (Plot size: 30ft)			
1. *Poa annua*	15	Yes	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	15	=Total Cover	
50% of total cover: 8		20% of total cover:	3

Woody Vine Stratum (Plot size: 15ft)			
1. *Ligustrum japonicum*	10	Yes	FAC
2.			
3.			
4.			
5.			
	10	=Total Cover	
50% of total cover: 5		20% of total cover:	2

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 60.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	35	x 3 =	105
FACU species	35	x 4 =	140
UPL species	0	x 5 =	0
Column Totals:	70 (A)		245 (B)

Prevalence Index = B/A = 3.50

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (If observed, list morphological adaptations below.)
Dry lead matter; no forbs.

SOIL

Sampling Point: W32 Up

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-8	10YR 4/3	100					Loamy/Clayey	
8-10	10YR 4/3	90	10YR 6/1	10	D	M	Loamy/Clayey	
10-12	10YR 4/3	30	10YR 6/1	30	D	M	Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ Organic Bodies (A6) **(LRR, P, T, U)**
___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
___ Muck Presence (A8) **(LRR U)**
___ 1 cm Muck (A9) **(LRR P, T)**
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Coast Prairie Redox (A16) **(MLRA 150A)**
___ Sandy Mucky Mineral (S1) **(LRR O, S)**
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7) **(LRR P, S, T, U)**
___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
___ Thin Dark Surface (S9) **(LRR S, T, U)**
___ Barrier Islands 1 cm Muck (S12) **(MLRA 153B, 153D)**
___ Loamy Mucky Mineral (F1) **(LRR O)**
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Marl (F10) **(LRR U)**
___ Depleted Ochric (F11) **(MLRA 151)**
___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
___ Umbric Surface (F13) **(LRR P, T, U)**
___ Delta Ochric (F17) **(MLRA 151)**
___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
___ Anomalous Bright Floodplain Soils (F20) **(MLRA 149A, 153C, 153D)**
___ Very Shallow Dark Surface (F22) **(MLRA 138, 152A in FL, 154)**

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) **(LRR O)**
___ 2 cm Muck (A10) **(LRR S)**
___ Coast Prairie Redox (A16) **(outside MLRA 150A)**
___ Reduced Vertic (F18) **(outside MLRA 150A, 150B)**
___ Piedmont Floodplain Soils (F19) **(LRR P, T)**
___ Anomalous Bright Floodplain Soils (F20) **(MLRA 153B)**
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (F22) **(outside MLRA 138, 152A in FL, 154)**
___ Barrier Islands Low Chroma Matrix (TS7) **(MLRA 153B, 153D)**
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:
No indicators of hydric soils are present.

U.S. Army Corps of Engineers **WETLAND DETERMINATION DATA SHEET – Atlantic and Gulf Coastal Plain Region** See ERDC/EL TR-07-24; the proponent agency is CECW-CO-R	*Requirement Control Symbol EXEMPT (Authority: AR 335-15, paragraph 5-2a)*

Project/Site: Yum Yum Solar City/County: Fayette Sampling Date: 1/16/2019

Applicant/Owner: Invenergy State: TN Sampling Point: W32 Wet

Investigator(s): Ryan Hammons, Tara Kent Section, Township, Range: _____

Landform (hillside, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): 0

Subregion (LRR or MLRA): LRR P, MLRA 134 Lat: 35.305626 Long: -89.392708 Datum: WGS84

Soil Map Unit Name: Henry silt loam, terrace NWI classification: PFO

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ___	**Is the Sampled Area within a Wetland?** **Yes** X **No** ___
Hydric Soil Present?	Yes X	No ___	
Wetland Hydrology Present?	Yes X	No ___	

Remarks:
Plot is located within a large forested wetland complex adjacent to a cotton field and along a large perennial stream.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15) **(LRR U)**
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- X Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- X FAC-Neutral Test (D5)
- ___ Sphagnum Moss (D8) **(LRR T,U)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes X	No ___	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes X	No ___	Depth (inches): ___

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Wetland hydrology is present.

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: W32 Wet

Tree Stratum (Plot size: 30ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Carya laciniosa*	25	Yes	FACW
2. *Liquidambar styraciflua*	15	Yes	FAC
3. *Platanus occidentalis*	10	No	FACW
4. *Quercus phellos*	10	No	FACW
5.			
6.			
7.			
8.			
	60	=Total Cover	
50% of total cover: 30		20% of total cover:	12

Sapling/Shrub Stratum (Plot size: 15ft)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
		=Total Cover	
50% of total cover:		20% of total cover:	

Herb Stratum (Plot size: 30ft)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
		=Total Cover	
50% of total cover:		20% of total cover:	

Woody Vine Stratum (Plot size: 15ft)			
1. *Ligustrum sinense*	5	Yes	FAC
2.			
3.			
4.			
5.			
	5	=Total Cover	
50% of total cover: 3		20% of total cover:	1

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	45	x 2 =	90
FAC species	20	x 3 =	60
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	65 (A)		150 (B)

Prevalence Index = B/A = 2.31

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (If observed, list morphological adaptations below.)
No herbaceous species were readily identifiable, only seedlings were present.

SOIL

Sampling Point: W32 Wet

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 4/3	90	10YR 5/2	10	D	M	Loamy/Clayey	
4-14	10YR 5/2	60	7.5YR 3/4	20	C	M	Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Organic Bodies (A6) **(LRR, P, T, U)**
- ___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ___ Muck Presence (A8) **(LRR U)**
- ___ 1 cm Muck (A9) **(LRR P, T)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Coast Prairie Redox (A16) **(MLRA 150A)**
- ___ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR P, S, T, U)**
- ___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ___ Thin Dark Surface (S9) **(LRR S, T, U)**
- ___ Barrier Islands 1 cm Muck (S12) **(MLRA 153B, 153D)**
- ___ Loamy Mucky Mineral (F1) **(LRR O)**
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) **(LRR U)**
- ___ Depleted Ochric (F11) **(MLRA 151)**
- ___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ___ Umbric Surface (F13) **(LRR P, T, U)**
- ___ Delta Ochric (F17) **(MLRA 151)**
- ___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 149A, 153C, 153D)**
- ___ Very Shallow Dark Surface (F22) **(MLRA 138, 152A in FL, 154)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR O)**
- ___ 2 cm Muck (A10) **(LRR S)**
- ___ Coast Prairie Redox (A16) **(outside MLRA 150A)**
- ___ Reduced Vertic (F18) **(outside MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(LRR P, T)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 153B)**
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22) **(outside MLRA 138, 152A in FL, 154)**
- ___ Barrier Islands Low Chroma Matrix (TS7) **(MLRA 153B, 153D)**
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:
Hydric soils are present.

U.S. Army Corps of Engineers **WETLAND DETERMINATION DATA SHEET – Atlantic and Gulf Coastal Plain Region** See ERDC/EL TR-07-24; the proponent agency is CECW-CO-R	*Requirement Control Symbol EXEMPT (Authority: AR 335-15, paragraph 5-2a)*

Project/Site: Yum Yum Solar City/County: Fayette Sampling Date: 1/14/2019

Applicant/Owner: Inenergy State: TN Sampling Point: W34 Up

Investigator(s): Michael Swenson, Katie Lueth Section, Township, Range: _____

Landform (hillside, terrace, etc.): Hillslope Local relief (concave, convex, none): Concave Slope (%): 6

Subregion (LRR or MLRA): LRR P, MLRA 134 Lat: 35.320885 Long: -89.439377 Datum: WGS84

Soil Map Unit Name: Grenada-Gullied land complex. 5 to 8 percent slopes NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___	No X	**Is the Sampled Area within a Wetland?** **Yes** ___ **No** X
Hydric Soil Present?	Yes ___	No X	
Wetland Hydrology Present?	Yes ___	No X	

Remarks:
Upland plot is located along a hillslope adjacent to a PEM wetland (W35).

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15) **(LRR U)**
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Sphagnum Moss (D8) **(LRR T,U)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No ___	Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of wetland hydrology are present.

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: W34 Up

Tree Stratum (Plot size: 30ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Quercus falcata*	35	Yes	FACU
2. *Juniperus virginiana*	25	Yes	FACU
3.			
4.			
5.			
6.			
7.			
8.			
	60	=Total Cover	
50% of total cover: 30		20% of total cover:	12

Sapling/Shrub Stratum (Plot size: 15ft)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
		=Total Cover	
50% of total cover:		20% of total cover:	

Herb Stratum (Plot size: 30ft)			
1. *Poa pratensis*	25	Yes	FAC
2. *Smilax bona-nox*	15	Yes	FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	40	=Total Cover	
50% of total cover: 20		20% of total cover:	8

Woody Vine Stratum (Plot size: 15ft)			
1.			
2.			
3.			
4.			
5.			
		=Total Cover	
50% of total cover:		20% of total cover:	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 25.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	25	x 3 =	75
FACU species	75	x 4 =	300
UPL species	0	x 5 =	0
Column Totals:	100 (A)		375 (B)

Prevalence Index = B/A = 3.75

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (If observed, list morphological adaptations below.)

SOIL

Sampling Point: W34 Up

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-20	10YR 4/3	100					Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Organic Bodies (A6) **(LRR, P, T, U)**
- ___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ___ Muck Presence (A8) **(LRR U)**
- ___ 1 cm Muck (A9) **(LRR P, T)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Coast Prairie Redox (A16) **(MLRA 150A)**
- ___ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR P, S, T, U)**
- ___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ___ Thin Dark Surface (S9) **(LRR S, T, U)**
- ___ Barrier Islands 1 cm Muck (S12) **(MLRA 153B, 153D)**
- ___ Loamy Mucky Mineral (F1) **(LRR O)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) **(LRR U)**
- ___ Depleted Ochric (F11) **(MLRA 151)**
- ___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ___ Umbric Surface (F13) **(LRR P, T, U)**
- ___ Delta Ochric (F17) **(MLRA 151)**
- ___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 149A, 153C, 153D)**
- ___ Very Shallow Dark Surface (F22) **(MLRA 138, 152A in FL, 154)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR O)**
- ___ 2 cm Muck (A10) **(LRR S)**
- ___ Coast Prairie Redox (A16) **(outside MLRA 150A)**
- ___ Reduced Vertic (F18) **(outside MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(LRR P, T)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 153B)**
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22) **(outside MLRA 138, 152A in FL, 154)**
- ___ Barrier Islands Low Chroma Matrix (TS7) **(MLRA 153B, 153D)**
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:
Hydric soils are not present.

U.S. Army Corps of Engineers **WETLAND DETERMINATION DATA SHEET – Atlantic and Gulf Coastal Plain Region** See ERDC/EL TR-07-24; the proponent agency is CECW-CO-R	*Requirement Control Symbol EXEMPT (Authority: AR 335-15, paragraph 5-2a)*

Project/Site: Yum Yum Solar City/County: Fayette Sampling Date: 1/14/2019

Applicant/Owner: Invenergy State: TN Sampling Point: W34 Wet

Investigator(s): Michael Swenson Katie Lueth Section, Township, Range: _____

Landform (hillside, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): 3

Subregion (LRR or MLRA): LRR P, MLRA 134 Lat: 35.320965 Long: -89.439316 Datum: WGS84

Soil Map Unit Name: Falaya silt loam, local alluvium NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ___	**Is the Sampled Area within a Wetland?** **Yes** X **No** ___
Hydric Soil Present?	Yes X	No ___	
Wetland Hydrology Present?	Yes X	No ___	

Remarks:
Plot is located in a PEM wetland that is located downhill along a drainage from a farm impoundment. Plot is applicable to wetland W35.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- X Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15) **(LRR U)**
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- X FAC-Neutral Test (D5)
- ___ Sphagnum Moss (D8) **(LRR T,U)**

Field Observations:

Surface Water Present?	Yes X	No ___	Depth (inches): 0.5
Water Table Present?	Yes X	No ___	Depth (inches): 0
Saturation Present? (includes capillary fringe)	Yes X	No ___	Depth (inches): 0

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Wetland hydrology is present.

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: W34 Wet

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
		=Total Cover	
50% of total cover:		20% of total cover:	

Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
		=Total Cover	
50% of total cover:		20% of total cover:	

Herb Stratum (Plot size: 30ft)			
1. *Carex diandra*	75	Yes	OBL
2. *Phalaris arundinacea*	20	Yes	FACW
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	95	=Total Cover	
50% of total cover: 48		20% of total cover: 19	

Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
		=Total Cover	
50% of total cover:		20% of total cover:	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	75	x 1 =	75
FACW species	20	x 2 =	40
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	95 (A)		115 (B)

Prevalence Index = B/A = 1.21

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- X 3 - Prevalence Index is ≤3.0[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (If observed, list morphological adaptations below.)

SOIL

Sampling Point: W34 Wet

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-20	10YR 4/1	70		30	D	M	Loamy/Clayey	Redox color is 5 YR (format error)

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Organic Bodies (A6) **(LRR, P, T, U)**
- ___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ___ Muck Presence (A8) **(LRR U)**
- ___ 1 cm Muck (A9) **(LRR P, T)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Coast Prairie Redox (A16) **(MLRA 150A)**
- ___ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR P, S, T, U)**
- ___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ___ Thin Dark Surface (S9) **(LRR S, T, U)**
- ___ Barrier Islands 1 cm Muck (S12) **(MLRA 153B, 153D)**
- ___ Loamy Mucky Mineral (F1) **(LRR O)**
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) **(LRR U)**
- ___ Depleted Ochric (F11) **(MLRA 151)**
- ___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ___ Umbric Surface (F13) **(LRR P, T, U)**
- ___ Delta Ochric (F17) **(MLRA 151)**
- ___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 149A, 153C, 153D)**
- ___ Very Shallow Dark Surface (F22) **(MLRA 138, 152A in FL, 154)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR O)**
- ___ 2 cm Muck (A10) **(LRR S)**
- ___ Coast Prairie Redox (A16) **(outside MLRA 150A)**
- ___ Reduced Vertic (F18) **(outside MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(LRR P, T)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 153B)**
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22) **(outside MLRA 138, 152A in FL, 154)**
- ___ Barrier Islands Low Chroma Matrix (TS7) **(MLRA 153B, 153D)**
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:
Hydric soils are present.

U.S. Army Corps of Engineers **WETLAND DETERMINATION DATA SHEET – Atlantic and Gulf Coastal Plain Region** See ERDC/EL TR-07-24; the proponent agency is CECW-CO-R	*Requirement Control Symbol EXEMPT (Authority: AR 335-15, paragraph 5-2a)*

Project/Site: Yum Yum Solar City/County: Fayette Sampling Date: 1/14/2019

Applicant/Owner: Invenergy State: TN Sampling Point: W37 Up

Investigator(s): Ryan Hammons, Tara Kent Section, Township, Range: _____

Landform (hillside, terrace, etc.): Hillslope Local relief (concave, convex, none): Convex Slope (%): 1

Subregion (LRR or MLRA): LRR P, MLRA 134 Lat: 35.330280 Long: -89.433556 Datum: WGS84

Soil Map Unit Name: Falaya silt loam NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___	No X	**Is the Sampled Area within a Wetland?** **Yes** ___ **No** X
Hydric Soil Present?	Yes ___	No X	
Wetland Hydrology Present?	Yes ___	No X	

Remarks:
Upland plot is located in an agricultural field adjacent to forested wetland. (W39)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15) **(LRR U)**
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Sphagnum Moss (D8) **(LRR T,U)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of wetland hydrology are present.

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: W37 Up

Tree Stratum (Plot size: 30ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Ulmus americana*	25	Yes	FAC
2. *Quercus rubra*	15	Yes	FACU
3.			
4.			
5.			
6.			
7.			
8.			
	40	=Total Cover	
50% of total cover: 20		20% of total cover:	8

Sapling/Shrub Stratum (Plot size: 15ft)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
		=Total Cover	
50% of total cover:		20% of total cover:	

Herb Stratum (Plot size: 30ft)			
1. *Gossypium hirsutum*	30	Yes	FACU
2. *Poa pratensis*	25	Yes	FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	55	=Total Cover	
50% of total cover: 28		20% of total cover:	11

Woody Vine Stratum (Plot size: 30ft)			
1. *Smilax bona-nox*	2	No	FAC
2.			
3.			
4.			
5.			
	2	=Total Cover	
50% of total cover: 1		20% of total cover:	1

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 25.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	27	x 3 =	81
FACU species	70	x 4 =	280
UPL species	0	x 5 =	0
Column Totals:	97 (A)		361 (B)

Prevalence Index = B/A = 3.72

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (If observed, list morphological adaptations below.)
Bare ground in winter, no forbs, lots of leaf litter.

SOIL

Sampling Point: W37 Up

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-8	10YR 4/3	100					Loamy/Clayey	
8-14	10YR 6/2	70	5YR 3/4	30	C	M	Loamy/Clayey	Prominent redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Organic Bodies (A6) **(LRR, P, T, U)**
- ___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ___ Muck Presence (A8) **(LRR U)**
- ___ 1 cm Muck (A9) **(LRR P, T)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Coast Prairie Redox (A16) **(MLRA 150A)**
- ___ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR P, S, T, U)**
- ___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ___ Thin Dark Surface (S9) **(LRR S, T, U)**
- ___ Barrier Islands 1 cm Muck (S12) **(MLRA 153B, 153D)**
- ___ Loamy Mucky Mineral (F1) **(LRR O)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) **(LRR U)**
- ___ Depleted Ochric (F11) **(MLRA 151)**
- ___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ___ Umbric Surface (F13) **(LRR P, T, U)**
- ___ Delta Ochric (F17) **(MLRA 151)**
- ___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 149A, 153C, 153D)**
- ___ Very Shallow Dark Surface (F22) **(MLRA 138, 152A in FL, 154)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR O)**
- ___ 2 cm Muck (A10) **(LRR S)**
- ___ Coast Prairie Redox (A16) **(outside MLRA 150A)**
- ___ Reduced Vertic (F18) **(outside MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(LRR P, T)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 153B)**
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22) **(outside MLRA 138, 152A in FL, 154)**
- ___ Barrier Islands Low Chroma Matrix (TS7) **(MLRA 153B, 153D)**
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

No indicators of hydric soils area present.

U.S. Army Corps of Engineers **WETLAND DETERMINATION DATA SHEET – Atlantic and Gulf Coastal Plain Region** See ERDC/EL TR-07-24; the proponent agency is CECW-CO-R	*Requirement Control Symbol* *EXEMPT* *(Authority: AR 335-15, paragraph 5-2a)*

Project/Site: Yum Yum Solar City/County: Fayette Sampling Date: 1/14/2019

Applicant/Owner: Invenergy State: TN Sampling Point: W37 Wet

Investigator(s): Ryan Hammons, Tara Kent Section, Township, Range: _____

Landform (hillside, terrace, etc.): Flat Local relief (concave, convex, none): None Slope (%): 0

Subregion (LRR or MLRA): LRR P, MLRA 134 Lat: 35.329552 Long: -89.433411 Datum: WGS84

Soil Map Unit Name: Henry silt loam, terrace NWI classification: PFO

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ___	**Is the Sampled Area within a Wetland?** **Yes** X **No** ___
Hydric Soil Present?	Yes X	No ___	
Wetland Hydrology Present?	Yes X	No ___	

Remarks:
Plot is located in a large PFO complex adjacent to an agricultural field. Plot is applicable to the following addition additional wetlands - W39.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15) **(LRR U)**
- ___ Hydrogen Sulfide Odor (C1)
- X Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- X FAC-Neutral Test (D5)
- ___ Sphagnum Moss (D8) **(LRR T,U)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): 0
Water Table Present?	Yes X	No ___	Depth (inches): 4
Saturation Present? (includes capillary fringe)	Yes X	No ___	Depth (inches): 0

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Wetland hydrology is present.

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: W37 Wet

Tree Stratum (Plot size: 30ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Liquidambar styraciflua*	25	Yes	FAC
2. *Celtis laevigata*	25	Yes	FACW
3. *Quercus michauxii*	15	Yes	FACW
4.			
5.			
6.			
7.			
8.			
	65	=Total Cover	
50% of total cover: 33		20% of total cover:	13

Sapling/Shrub Stratum (Plot size: 15ft)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
		=Total Cover	
50% of total cover:		20% of total cover:	

Herb Stratum (Plot size: 30ft)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
		=Total Cover	
50% of total cover:		20% of total cover:	

Woody Vine Stratum (Plot size: 15ft)			
1. *Smilax bona-nox*	2	No	FAC
2.			
3.			
4.			
5.			
	2	=Total Cover	
50% of total cover: 1		20% of total cover:	1

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	40	x 2 =	80
FAC species	27	x 3 =	81
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	67 (A)		161 (B)

Prevalence Index = B/A = 2.40

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- X 3 - Prevalence Index is ≤3.0[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (If observed, list morphological adaptations below.)
Lots of leaf litter; winter, no forbs.

SOIL

Sampling Point: W37 Wet

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-7	10YR 5/2	70	5YR 4/6	30	C	PL	Loamy/Clayey	
7-12	10YR 6/1	60	5YR 3/4	40	C	M	Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Organic Bodies (A6) **(LRR, P, T, U)**
- ___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ___ Muck Presence (A8) **(LRR U)**
- ___ 1 cm Muck (A9) **(LRR P, T)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Coast Prairie Redox (A16) **(MLRA 150A)**
- ___ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR P, S, T, U)**
- ___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ___ Thin Dark Surface (S9) **(LRR S, T, U)**
- ___ Barrier Islands 1 cm Muck (S12) **(MLRA 153B, 153D)**
- ___ Loamy Mucky Mineral (F1) **(LRR O)**
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) **(LRR U)**
- ___ Depleted Ochric (F11) **(MLRA 151)**
- ___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ___ Umbric Surface (F13) **(LRR P, T, U)**
- ___ Delta Ochric (F17) **(MLRA 151)**
- ___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 149A, 153C, 153D)**
- ___ Very Shallow Dark Surface (F22) **(MLRA 138, 152A in FL, 154)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR O)**
- ___ 2 cm Muck (A10) **(LRR S)**
- X Coast Prairie Redox (A16) **(outside MLRA 150A)**
- ___ Reduced Vertic (F18) **(outside MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(LRR P, T)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 153B)**
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22) **(outside MLRA 138, 152A in FL, 154)**
- ___ Barrier Islands Low Chroma Matrix (TS7) **(MLRA 153B, 153D)**
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:
Hydric soils are present.

U.S. Army Corps of Engineers **WETLAND DETERMINATION DATA SHEET – Atlantic and Gulf Coastal Plain Region** See ERDC/EL TR-07-24; the proponent agency is CECW-CO-R	*Requirement Control Symbol EXEMPT (Authority: AR 335-15, paragraph 5-2a)*

Project/Site: Yum Yum Solar City/County: Fayette Sampling Date: 1/14/2019

Applicant/Owner: Invenergy State: TN Sampling Point: W38 Up

Investigator(s): Michael Swenson, Katie Lueth Section, Township, Range: _____

Landform (hillside, terrace, etc.): Floodplain Local relief (concave, convex, none): Concave Slope (%): 0

Subregion (LRR or MLRA): LRR P, MLRA 134 Lat: 35.324852 Long: -89.451675 Datum: WGS84

Soil Map Unit Name: Falaya silt loam NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
Upland plot is located near an agricultural field edge in a forested area and W41, W42, W43, and W44.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15) **(LRR U)**
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Sphagnum Moss (D8) **(LRR T,U)**

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Indicators of wetland hydrology are not present.

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: W38 Up

Tree Stratum (Plot size: 30ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Quercus falcata*	25	Yes	FACU
2. *Ulmus americana*	15	Yes	FAC
3.			
4.			
5.			
6.			
7.			
8.			
	40	=Total Cover	
50% of total cover: 20		20% of total cover:	8

Sapling/Shrub Stratum (Plot size: 15ft)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
		=Total Cover	
50% of total cover:		20% of total cover:	

Herb Stratum (Plot size: 30ft)			
1. *Microstegium vimineum*	25	Yes	FAC
2. *Smilax bona-nox*	25	Yes	FACU
3. *Mitella diphylla*	15	Yes	FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	65	=Total Cover	
50% of total cover: 33		20% of total cover:	13

Woody Vine Stratum (Plot size: 15ft)			
1.			
2.			
3.			
4.			
5.			
		=Total Cover	
50% of total cover:		20% of total cover:	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 40.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	40	x 3 =	120
FACU species	65	x 4 =	260
UPL species	0	x 5 =	0
Column Totals:	105 (A)		380 (B)

Prevalence Index = B/A = 3.62

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (If observed, list morphological adaptations below.)

SOIL

Sampling Point: W38 Up

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-10	10YR 3/2	100					Loamy/Clayey	
10-18	10YR 4/3	100					Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Organic Bodies (A6) **(LRR, P, T, U)**
- ___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ___ Muck Presence (A8) **(LRR U)**
- ___ 1 cm Muck (A9) **(LRR P, T)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Coast Prairie Redox (A16) **(MLRA 150A)**
- ___ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR P, S, T, U)**
- ___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ___ Thin Dark Surface (S9) **(LRR S, T, U)**
- ___ Barrier Islands 1 cm Muck (S12) **(MLRA 153B, 153D)**
- ___ Loamy Mucky Mineral (F1) **(LRR O)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) **(LRR U)**
- ___ Depleted Ochric (F11) **(MLRA 151)**
- ___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ___ Umbric Surface (F13) **(LRR P, T, U)**
- ___ Delta Ochric (F17) **(MLRA 151)**
- ___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 149A, 153C, 153D)**
- ___ Very Shallow Dark Surface (F22) **(MLRA 138, 152A in FL, 154)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR O)**
- ___ 2 cm Muck (A10) **(LRR S)**
- ___ Coast Prairie Redox (A16) **(outside MLRA 150A)**
- ___ Reduced Vertic (F18) **(outside MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(LRR P, T)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 153B)**
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22) **(outside MLRA 138, 152A in FL, 154)**
- ___ Barrier Islands Low Chroma Matrix (TS7) **(MLRA 153B, 153D)**
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

Indicators of hydric soils are not present.

Appendix F

Representative Photographs

Latitude	N 35° 19' 40.19"
Longitude	W 89° 26' 37.82"
Time Stamp	11:25:49 AM
Date Stamp	1/14/2019
Photo Direction	57° ENE

S001

Latitude	N 35° 19' 22.60"
Longitude	W 89° 24' 39.20"
Time Stamp	10:11:27 AM
Date Stamp	11/14/2018
Photo Direction	15° NNE

S002

Latitude	N 35° 20' 06.94"
Longitude	W 89° 23' 40.45"
Time Stamp	9:06:28 AM
Date Stamp	1/15/2019
Photo Direction	97° E

S003

Latitude	N 35° 18' 57.95"
Longitude	W 89° 23' 37.04"
Time Stamp	12:37:15 PM
Date Stamp	1/16/2019
Photo Direction	26° NNE

S004

Latitude	N 35° 18' 27.11"
Longitude	W 89° 23' 33.89"
Time Stamp	11:35:23 AM
Date Stamp	1/16/2019
Photo Direction	285° WNW

S005

Latitude	N 35° 19' 30.54"
Longitude	W 89° 26' 53.70"
Time Stamp	11:37:46 AM
Date Stamp	1/14/2019
Photo Direction	11° N

S006

Latitude	N 35° 20' 29.70"
Longitude	W 89° 23' 38.06"
Time Stamp	10:31:51 AM
Date Stamp	3/12/2019
Photo Direction	253° WSW

S007

Latitude	N 35° 19' 26.84"
Longitude	W 89° 26' 28.73"
Time Stamp	2:36:33 PM
Date Stamp	1/14/2019
Photo Direction	295° WNW

S008

Latitude	N 35° 20' 07.25"
Longitude	W 89° 27' 24.85"
Time Stamp	11:09:19 AM
Date Stamp	1/14/2019
Photo Direction	177° S

S009

Latitude	N 35° 20' 04.69"
Longitude	W 89° 27' 11.99"
Time Stamp	12:15:07 PM
Date Stamp	1/14/2019
Photo Direction	329° NNW

S010

Latitude	N 35° 20' 03.88"
Longitude	W 89° 26' 56.56"
Time Stamp	12:38:01 PM
Date Stamp	1/14/2019
Photo Direction	206° SSW

S011

Latitude	N 35° 19' 39.82"
Longitude	W 89° 27' 07.24"
Time Stamp	10:05:36 AM
Date Stamp	1/14/2019
Photo Direction	176° S

S012

Latitude	N 35° 19' 32.02"
Longitude	W 89° 26' 55.07"
Time Stamp	11:40:30 AM
Date Stamp	1/14/2019
Photo Direction	279° W

S013

Latitude	N 35° 19' 32.13"
Longitude	W 89° 26' 41.39"
Time Stamp	2:45:45 PM
Date Stamp	1/14/2019
Photo Direction	339° NNW

S014

Latitude	N 35° 19' 19.79"
Longitude	W 89° 26' 36.31"
Time Stamp	1:39:51 PM
Date Stamp	1/14/2019
Photo Direction	169° S

S015

Latitude	N 35° 19' 41.62"
Longitude	W 89° 26' 14.07"
Time Stamp	3:42:52 PM
Date Stamp	1/14/2019
Photo Direction	255° WSW

S016

Latitude	N 35° 19' 19.63"
Longitude	W 89° 26' 21.59"
Time Stamp	3:12:01 PM
Date Stamp	1/14/2019
Photo Direction	6° N

S017

Latitude	N 35° 19' 39.42"
Longitude	W 89° 25' 58.16"
Time Stamp	2:26:02 PM
Date Stamp	1/14/2019
Photo Direction	145° SE

S019

Latitude	N 35° 19' 15.72"
Longitude	W 89° 26' 03.19"
Time Stamp	11:30:45 AM
Date Stamp	1/17/2019
Photo Direction	258° WSW

S020

Latitude	N 35° 19' 18.95"
Longitude	W 89° 26' 10.91"
Time Stamp	11:38:46 AM
Date Stamp	1/17/2019
Photo Direction	304° NW

S021

Latitude	N 35° 19' 09.77"
Longitude	W 89° 25' 47.53"
Time Stamp	11:05:40 AM
Date Stamp	1/17/2019
Photo Direction	335° NNW

S022

Latitude	N 35° 19' 06.22"
Longitude	W 89° 25' 33.22"
Time Stamp	10:46:39 AM
Date Stamp	1/17/2019
Photo Direction	78° ENE

S023

Latitude	N 35° 19' 35.34"
Longitude	W 89° 25' 27.37"
Time Stamp	8:46:26 AM
Date Stamp	11/13/2018
Photo Direction	133° SE

S024

Latitude	N 35° 19' 36.58"
Longitude	W 89° 25' 18.86"
Time Stamp	8:32:24 AM
Date Stamp	11/13/2018
Photo Direction	356° N

S025

Latitude	N 35° 19' 24.07"
Longitude	W 89° 25' 13.15"
Time Stamp	8:12:16 AM
Date Stamp	11/13/2018
Photo Direction	341° NNW

S027

Latitude	N 35° 19' 50.15"
Longitude	W 89° 24' 42.69"
Time Stamp	1:07:18 PM
Date Stamp	11/14/2018
Photo Direction	45° NE

S029

Latitude	N 35° 19' 54.08"
Longitude	W 89° 23' 38.12"
Time Stamp	1:43:28 PM
Date Stamp	1/15/2019
Photo Direction	197° SSW

S030

Latitude	N 35° 19' 46.52"
Longitude	W 89° 23' 14.96"
Time Stamp	1:13:31 PM
Date Stamp	1/15/2019
Photo Direction	63° ENE

S032

Latitude	N 35° 20' 00.65"
Longitude	W 89° 23' 18.70"
Time Stamp	12:29:03 PM
Date Stamp	1/15/2019
Photo Direction	198° SSW

S033

Latitude	N 35° 20' 01.66"
Longitude	W 89° 23' 16.20"
Time Stamp	12:27:03 PM
Date Stamp	1/15/2019
Photo Direction	266° W

S034

Latitude	N 35° 20' 10.83"
Longitude	W 89° 22' 50.54"
Time Stamp	9:34:05 AM
Date Stamp	3/12/2019
Photo Direction	358° N

S035

Latitude	N 35° 19' 38.96"
Longitude	W 89° 22' 42.94"
Time Stamp	9:47:48 AM
Date Stamp	1/15/2019
Photo Direction	55° NE

S036

Latitude	N 35° 19' 47.53"
Longitude	W 89° 22' 29.53"
Time Stamp	10:30:33 AM
Date Stamp	1/15/2019
Photo Direction	205° SSW

S037

Latitude	N 35° 20' 14.63"
Longitude	W 89° 22' 33.13"
Time Stamp	9:21:21 AM
Date Stamp	3/12/2019
Photo Direction	189° S

S038

Latitude	N 35° 20' 14.09"
Longitude	W 89° 22' 34.75"
Time Stamp	9:19:42 AM
Date Stamp	3/12/2019
Photo Direction	91° E

S039

Latitude	N 35° 20' 33.70"
Longitude	W 89° 23' 26.47"
Time Stamp	10:57:43 AM
Date Stamp	3/12/2019
Photo Direction	117° ESE

S040

Latitude	N 35° 20' 31.10"
Longitude	W 89° 23' 12.24"
Time Stamp	10:19:59 AM
Date Stamp	3/12/2019
Photo Direction	258° WSW

S041

Latitude	N 35° 20' 24.80"
Longitude	W 89° 23' 16.83"
Time Stamp	10:02:36 AM
Date Stamp	3/12/2019
Photo Direction	334° NNW

S042

Latitude	N 35° 20' 31.73"
Longitude	W 89° 23' 02.90"
Time Stamp	10:31:38 AM
Date Stamp	3/12/2019
Photo Direction	248° WSW

S043

Latitude	N 35° 20' 26.93"
Longitude	W 89° 22' 37.47"
Time Stamp	9:00:09 AM
Date Stamp	3/12/2019
Photo Direction	297° WNW

S046

Latitude	N 35° 20' 21.89"
Longitude	W 89° 22' 04.04"
Time Stamp	12:37:10 PM
Date Stamp	1/15/2019
Photo Direction	292° WNW

S049

Latitude	N 35° 20' 17.04"
Longitude	W 89° 22' 01.55"
Time Stamp	12:33:07 PM
Date Stamp	1/15/2019
Photo Direction	339° NNW

S050

Latitude	N 35° 20' 14.39"
Longitude	W 89° 23' 08.56"
Time Stamp	11:10:15 AM
Date Stamp	1/15/2019
Photo Direction	197° SSW

S051

Latitude	N 35° 18' 31.99"
Longitude	W 89° 23' 23.15"
Time Stamp	9:29:54 AM
Date Stamp	1/16/2019
Photo Direction	90° E

S052

Latitude	N 35° 18' 47.95"
Longitude	W 89° 23' 47.62"
Time Stamp	12:28:18 PM
Date Stamp	1/16/2019
Photo Direction	206° SSW

S053

Latitude	N 35° 18' 50.82"
Longitude	W 89° 23' 46.00"
Time Stamp	12:32:55 PM
Date Stamp	1/16/2019
Photo Direction	62° ENE

S054

Latitude	N 35° 18' 57.80"
Longitude	W 89° 23' 16.80"
Time Stamp	10:59:28 AM
Date Stamp	1/16/2019
Photo Direction	184° S

S055

Latitude	N 35° 18' 54.06"
Longitude	W 89° 22' 54.80"
Time Stamp	10:45:51 AM
Date Stamp	1/16/2019
Photo Direction	281° W

S056

Latitude	N 35° 20' 29.91"
Longitude	W 89° 23' 34.49"
Time Stamp	10:35:26 AM
Date Stamp	3/12/2019
Photo Direction	80° E

S057

Stream features without associated photos include S018, S028, S044, S045, S047, and S048.

Latitude	N 35° 19' 31.05"
Longitude	W 89° 26' 09.71"
Photo Direction	308° NW
Time Stamp	5:41:24 AM
Date Stamp	4/11/2019

W01

Latitude	N 35° 18' 55.00"
Longitude	W 89° 23' 11.28"
Photo Direction	339° NNW
Time Stamp	10:59:50 AM
Date Stamp	1/16/2019

W03

Latitude	N 35° 19' 37.08"
Longitude	W 89° 24' 55.49"
Photo Direction	250° WSW
Time Stamp	2:00:28 PM
Date Stamp	11/14/2018

W08

Latitude	N 35° 19' 31.97"
Longitude	W 89° 26' 49.58"
Photo Direction	355° N
Time Stamp	11:28:46 AM
Date Stamp	1/14/2019

W09

Latitude	N 35° 19' 10.72"
Longitude	W 89° 26' 00.00"
Photo Direction	195° SSW
Time Stamp	11:25:09 AM
Date Stamp	1/17/2019

W10

Latitude	N 35° 19' 13.62"
Longitude	W 89° 25' 57.37"
Photo Direction	330° NNW
Time Stamp	11:17:12 AM
Date Stamp	1/17/2019

W11

Latitude	N 35° 19' 10.25"
Longitude	W 89° 25' 53.85"
Photo Direction	175° S
Time Stamp	11:22:30 AM
Date Stamp	1/17/2019

W12

Latitude	N 35° 19' 05.53"
Longitude	W 89° 25' 44.02"
Photo Direction	339° NNW
Time Stamp	10:58:05 AM
Date Stamp	1/17/2019

W14

Latitude	N 35° 19' 00.31"
Longitude	W 89° 23' 41.27"
Photo Direction	276° W
Time Stamp	12:41:13 PM
Date Stamp	1/16/2019

W16

Latitude	N 35° 19' 23.44"
Longitude	W 89° 24' 45.82"
Photo Direction	244° WSW
Time Stamp	12:24:49 PM
Date Stamp	11/14/2018

W17

Latitude	N 35° 19' 28.71"
Longitude	W 89° 24' 40.60"
Photo Direction	97° E
Time Stamp	10:28:42 AM
Date Stamp	11/14/2018

W18

Latitude	N 35° 19' 23.41"
Longitude	W 89° 24' 55.10"
Photo Direction	166° SSE
Time Stamp	8:02:01 AM
Date Stamp	11/14/2018

W19

Latitude	N 35° 19' 58.37"
Longitude	W 89° 22' 38.10"
Photo Direction	276° W
Time Stamp	8:36:10 AM
Date Stamp	1/15/2019

W20

Latitude	N 35° 19' 51.63"
Longitude	W 89° 23' 52.73"
Photo Direction	163° SSE
Time Stamp	2:33:28 PM
Date Stamp	1/15/2019

W21

Latitude	N 35° 20' 05.74"
Longitude	W 89° 23' 00.38"
Photo Direction	259° W
Time Stamp	12:10:11 PM
Date Stamp	1/15/2019

W22

Latitude	N 35° 19' 41.92"
Longitude	W 89° 22' 18.24"
Photo Direction	332° NNW
Time Stamp	2:08:10 PM
Date Stamp	1/15/2019

W23

Latitude	N 35° 19' 40.82"
Longitude	W 89° 22' 13.08"
Photo Direction	202° SSW
Time Stamp	2:01:57 PM
Date Stamp	1/15/2019

W24

Latitude	N 35° 20' 11.76"
Longitude	W 89° 21' 53.83"
Photo Direction	145° SE
Time Stamp	12:53:05 PM
Date Stamp	1/15/2019

W26

Latitude	N 35° 20' 13.91"
Longitude	W 89° 22' 16.02"
Photo Direction	188° S
Time Stamp	11:53:32 AM
Date Stamp	1/15/2019

W27

Latitude	N 35° 19' 47.53"
Longitude	W 89° 22' 29.53"
Photo Direction	53° NE
Time Stamp	10:30:30 AM
Date Stamp	1/15/2019

W28

Latitude	N 35° 19' 33.00"
Longitude	W 89° 23' 29.55"
Photo Direction	314° NW
Time Stamp	9:47:47 AM
Date Stamp	1/16/2019

W29

Latitude	N 35° 19' 39.77"
Longitude	W 89° 23' 35.51"
Photo Direction	147° SSE
Time Stamp	2:13:36 PM
Date Stamp	1/15/2019

W30

Latitude	N 35° 19' 11.74"
Longitude	W 89° 23' 12.98"
Photo Direction	88° E
Time Stamp	10:02:30 AM
Date Stamp	1/16/2019

W31

Latitude	N 35° 18' 23.76"
Longitude	W 89° 23' 44.73"
Photo Direction	223° SW
Time Stamp	11:54:30 AM
Date Stamp	1/16/2019

W32

Latitude	N 35° 19' 14.69"
Longitude	W 89° 26' 20.93"
Photo Direction	121° ESE
Time Stamp	2:09:51 PM
Date Stamp	1/14/2019

W33

Latitude	N 35° 19' 16.83"
Longitude	W 89° 26' 21.70"
Photo Direction	161° SSE
Time Stamp	2:07:57 PM
Date Stamp	1/14/2019

W34

Latitude	N 35° 19' 33.44"
Longitude	W 89° 26' 39.97"
Photo Direction	342° NNW
Time Stamp	2:55:31 PM
Date Stamp	1/14/2019

W35

Latitude	N 35° 19' 33.44"
Longitude	W 89° 26' 13.10"
Photo Direction	250° WSW
Time Stamp	3:18:53 PM
Date Stamp	1/14/2019

W36

Latitude	N 35° 19' 38.13"
Longitude	W 89° 26' 24.94"
Photo Direction	308° NW
Time Stamp	3:32:08 PM
Date Stamp	1/14/2019

W37

Latitude	N 35° 19' 29.19"
Longitude	W 89° 27' 05.37"
Photo Direction	188° S
Time Stamp	9:54:52 AM
Date Stamp	1/14/2019

W38

Latitude	N 35° 19' 16.24"
Longitude	W 89° 26' 32.17"
Photo Direction	289° WNW
Time Stamp	1:24:47 PM
Date Stamp	1/14/2019

W39

Latitude	N 35° 19' 18.69"
Longitude	W 89° 25' 28.39"
Photo Direction	140° SE
Time Stamp	12:09:09 PM
Date Stamp	1/17/2019

W40

Latitude	N 35° 19' 57.87"
Longitude	W 89° 22' 39.28"
Photo Direction	156° SSE
Time Stamp	8:42:18 AM
Date Stamp	1/15/2019

W41

Latitude	N 35° 20' 33.34"
Longitude	W 89° 23' 15.98"
Photo Direction	72° ENE
Time Stamp	10:13:38 AM
Date Stamp	3/12/2019

W42

Latitude	N 35° 20' 27.04"
Longitude	W 89° 23' 39.05"
Photo Direction	2° N
Time Stamp	10:21:27 AM
Date Stamp	3/12/2019

W43

Latitude	N 35° 20' 31.35"
Longitude	W 89° 23' 10.35"
Photo Direction	61° ENE
Time Stamp	10:21:15 AM
Date Stamp	3/12/2019

W44

Latitude	N 35° 20' 22.92"
Longitude	W 89° 22' 38.46"
Photo Direction	188° S
Time Stamp	10:02:19 AM
Date Stamp	3/12/2019

W45

DEPARTMENT OF THE ARMY
MEMPHIS DISTRICT CORPS OF ENGINEERS
167 NORTH MAIN STREET B-202
MEMPHIS, TENNESSEE 38103-1894

October 3, 2019

Ms. Kelly Thames
HDR, Inc.
440 South Church Street, Suite 1000
Charlotte, North Carolina 28202-2075

Dear Ms. Thames:

This is in response to your request for a preliminary jurisdictional determination (PJD) for the Yum Yum Solar project. The project is located on 2,876 contiguous acres along both sides of Stanton Road and north of Highway 59 in Fayette County, Tennessee, as shown on the enclosed map. Based on the information submitted to our office, and a site visit we conducted on August 13, 2019, we concur with your determination. There are 24 wetlands (43.78 acres), 15 open water ponds (11.32 acres), and 57 streams (67,195 l.f.) on the property which may be considered waters of the United States. If you wish to provide additional information, you may request an approved jurisdictional determination.

The PJD is included for your concurrence. If you agree with this PJD please sign the form and return it to the address listed above. If the PJD is not returned within 30 days of the date of this letter we will assume your concurrence. A PJD cannot be appealed. If you object to this PJD, please see Section I.E. of the attached Notification of Administrative Appeal Options and the Process and Request for Appeal Form, on how to proceed or call the Memphis District Regulatory Branch for assistance at the number listed below.

The Memphis District Regulatory Branch is committed to providing quality and timely service to our customers. In an effort to improve customer service, we invite you to complete a Customer Service Survey found on our web site at http://corpsmapu.usace.army.mil/cm_apex/f?p=regulatory_survey. Your comments, positive or negative, will not affect any current or future dealing with the Corps of Engineers.

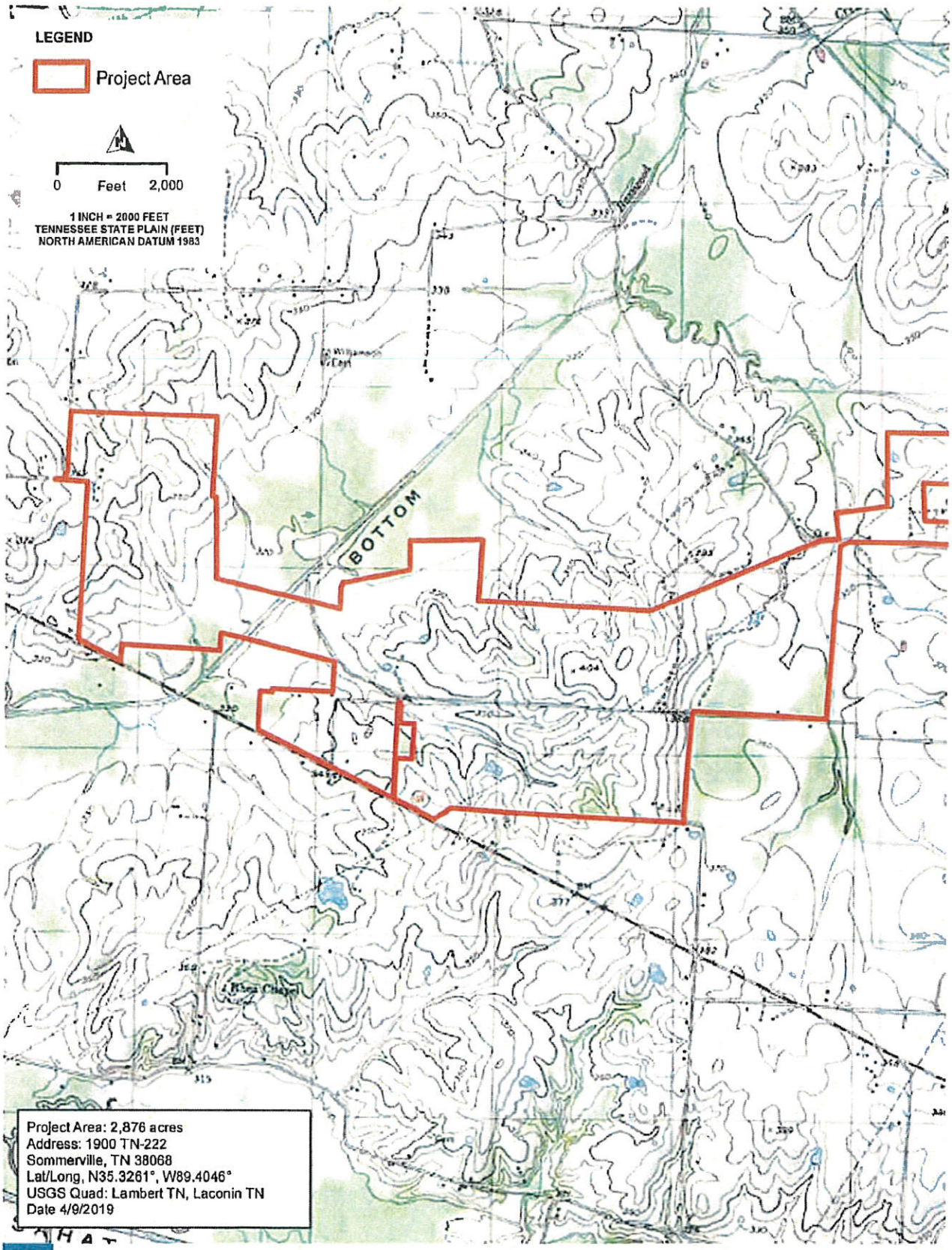
If you have questions, please contact me at (901) 544-0737 and refer to File No. MVM-2019-188.

Sincerely,

James M. Elcan

James M. Elcan
Biologist
Regulatory Branch

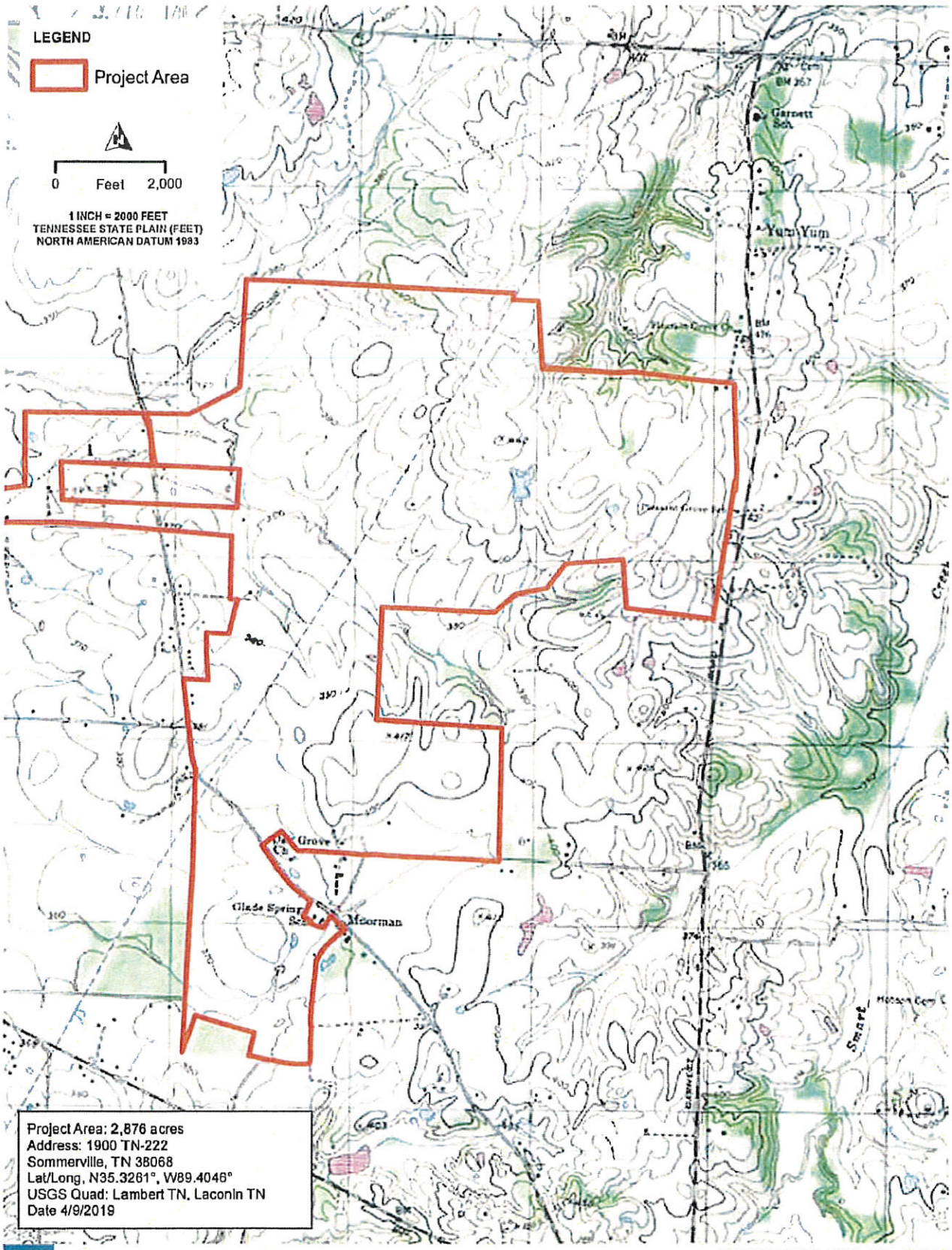
Enclosures



YUM YUM SOLAR SITE

USGS TOPOGRAPHIC QUADRANGLE

FIGURE 2A



YUM YUM SOLAR SITE

USGS TOPOGRAPHIC QUADRANGLE

FIGURE 2B

Appendix 2 - PRELIMINARY JURISDICTIONAL DETERMINATION (PJD) FORM

BACKGROUND INFORMATION

A. REPORT COMPLETION DATE FOR PJD: 01 October 2019

B. NAME AND ADDRESS OF PERSON REQUESTING PJD: Kelly Thames, HDR, 440 S. Church Street, Suite 1000, Charlotte, NC 28202-2075

C. DISTRICT OFFICE, FILE NAME, AND NUMBER: MVM-2019-188

D. PROJECT LOCATION(S) AND BACKGROUND INFORMATION:
(USE THE TABLE BELOW TO DOCUMENT MULTIPLE AQUATIC RESOURCES AND/OR AQUATIC RESOURCES AT DIFFERENT SITES)

State: TN County/parish/borough: Fayette City:

Center coordinates of site (lat/long in degree decimal format):

Lat.: 35.3261 Long.: -89.4046

Universal Transverse Mercator: 16

Name of nearest waterbody: Laurel Creek Canal

E. REVIEW PERFORMED FOR SITE EVALUATION (CHECK ALL THAT APPLY):

☐ Office (Desk) Determination. Date:

☒ Field Determination. Date(s): August 13, 2019

TABLE OF AQUATIC RESOURCES IN REVIEW AREA WHICH "MAY BE" SUBJECT TO REGULATORY JURISDICTION.

Site number	Latitude (decimal degrees)	Longitude (decimal degrees)	Estimated amount of aquatic resource in review area (acreage and linear feet, if applicable)	Type of aquatic resource (i.e., wetland vs. non-wetland waters)	Geographic authority to which the aquatic resource "may be" subject (i.e., Section 404 or Section 10/404)
*					

* See RGL16-01 PJD Form Additional Table Entries, attached

1) The Corps of Engineers believes that there may be jurisdictional aquatic resources in the review area, and the requestor of this PJD is hereby advised of his or her option to request and obtain an approved JD (AJD) for that review area based on an informed decision after having discussed the various types of JDs and their characteristics and circumstances when they may be appropriate.

2) In any circumstance where a permit applicant obtains an individual permit, or a Nationwide General Permit (NWP) or other general permit verification requiring "pre-construction notification" (PCN), or requests verification for a non-reporting NWP or other general permit, and the permit applicant has not requested an AJD for the activity, the permit applicant is hereby made aware that: (1) the permit applicant has elected to seek a permit authorization based on a PJD, which does not make an official determination of jurisdictional aquatic resources; (2) the applicant has the option to request an AJD before accepting the terms and conditions of the permit authorization, and that basing a permit authorization on an AJD could possibly result in less compensatory mitigation being required or different special conditions; (3) the applicant has the right to request an individual permit rather than accepting the terms and conditions of the NWP or other general permit authorization; (4) the applicant can accept a permit authorization and thereby agree to comply with all the terms and conditions of that permit, including whatever mitigation requirements the Corps has determined to be necessary; (5) undertaking any activity in reliance upon the subject permit authorization without requesting an AJD constitutes the applicant's acceptance of the use of the PJD; (6) accepting a permit authorization (e.g., signing a proffered individual permit) or undertaking any activity in reliance on any form of Corps permit authorization based on a PJD constitutes agreement that all aquatic resources in the review area affected in any way by that activity will be treated as jurisdictional, and waives any challenge to such jurisdiction in any administrative or judicial compliance or enforcement action, or in any administrative appeal or in any Federal court; and (7) whether the applicant elects to use either an AJD or a PJD, the JD will be processed as soon as practicable. Further, an AJD, a proffered individual permit (and all terms and conditions contained therein), or individual permit denial can be administratively appealed pursuant to 33 C.F.R. Part 331. If, during an administrative appeal, it becomes appropriate to make an official determination whether geographic jurisdiction exists over aquatic resources in the review area, or to provide an official delineation of jurisdictional aquatic resources in the review area, the Corps will provide an AJD to accomplish that result, as soon as is practicable. This PJD finds that there *"may be"* waters of the U.S. and/or that there *"may be"* navigable waters of the U.S. on the subject review area, and identifies all aquatic features in the review area that could be affected by the proposed activity, based on the following information:

SUPPORTING DATA. Data reviewed for PJD (check all that apply)

Checked items should be included in subject file. Appropriately reference sources below where indicated for all checked items:

- [x] Maps, plans, plots or plat submitted by or on behalf of the PJD requestor:
  Map: Yum Yum Solar, LLC.
- [x] Data sheets prepared/submitted by or on behalf of the PJD requestor.
  - [x] Office concurs with data sheets/delineation report.
  - [ ] Office does not concur with data sheets/delineation report. Rationale: _____.
- [ ] Data sheets prepared by the Corps: _____.
- [ ] Corps navigable waters' study: _____.
- [x] U.S. Geological Survey Hydrologic Atlas: _____.
  - [ ] USGS NHD data.
  - [x] USGS 8 and 12 digit HUC maps.
- [x] U.S. Geological Survey map(s). Cite scale & quad name: Lambert and Laconin, TN 7.5'.
- [x] Natural Resources Conservation Service Soil Survey. Citation: Fayette Co.
- [x] National wetlands inventory map(s). Cite name: ORM2 digitized.
- [ ] State/local wetland inventory map(s): _____.
- [ ] FEMA/FIRM maps: _____.
- [ ] 100-year Floodplain Elevation is: _____.(National Geodetic Vertical Datum of 1929)
- [x] Photographs: [ ] Aerial (Name & Date): _____.
  or [x] Other (Name & Date): Filed photos in HDR report.
- [ ] Previous determination(s). File no. and date of response letter: _____.
- [ ] Other information (please specify): _____.

IMPORTANT NOTE: The information recorded on this form has not necessarily been verified by the Corps and should not be relied upon for later jurisdictional determinations.

ELCAN.JAMES.M.II.1106137150 Digitally signed by ELCAN.JAMES.M.II.1106137150 Date: 2019.10.01 08:00:44 -05'00'

Signature and date of Regulatory staff member completing PJD

Signature and date of person requesting PJD (REQUIRED, unless obtaining the signature is impracticable)[1]

[1] Districts may establish timeframes for requestor to return signed PJD forms. If the requestor does not respond within the established time frame, the district may presume concurrence and no additional follow up is necessary prior to finalizing an action.

RGL 16-01: TABLE OF AQUATIC RESOURCES IN REVIEW AREA WHICH "MAY BE" SUBJECT TO REGULATORY JURISDICTION					
Site number	Latitude (decimal degrees)	Longitude (decimal degrees)	Estimated amount of aquatic resource in review area (acreage and linear feet, if applicable)	Type of aquatic resource (i.e., wetland vs. non-wetland waters)	Geographic authority to which the aquatic resource "may be" subject (i.e., Section 404 or Section 10/404)
S001 (Laurel Creek Canal)	35.327065	-89.444402	1107.08	R2	Section 404
S002	35.32393	-89.410873	2423.96	R5	Section 404
S003	35.325584	-89.385636	5661	R5	Section 404
S004	35.316583	-89.392779	1362.58	R5	Section 404
S005	35.311868	-89.388017	3490.46	R5	Section 404
S006	35.327522	-89.447176	1742.07	R5	Section 404
S007	35.342975	-89.392044	1122.17	R5	Section 404
S008	35.322298	-89.437075	3430.87	R5	Section 404
S009	35.334777	-89.456312	384.65	R4	Section 404
S010	35.334767	-89.450845	1200.55	R4	Section 404
S011	35.33441	-89.449043	556.66	R5	Section 404
S012	35.329764	-89.453331	2636.22	R5	Section 404
S013	35.32564	-89.449225	381.38	R4	Section 404
S014	35.322225	-89.445701	962.46	R4	Section 404
S015	35.322035	-89.443237	561.83	R4	Section 404
S016	35.328401	-89.436814	960.22	R4	Section 404
S017	35.322162	-89.43931	398.7	R4	Section 404
S018	35.322413	-89.436576	137.91	R4	Section 404
S019a	35.326007	-89.432049	1236.8	R4	Section 404
S019b	35.327478	-89.433018	231.47	R4	Section 404
S020	35.321028	-89.434147	1167.51	R5	Section 404
S021	35.321934	-89.436176	288.22	R4	Section 404
S022	35.318725	-89.426042	1970.52	R5	Section 404
S023	35.316824	-89.423729	1157.74	R4	Section 404
S024	35.326283	-89.423931	521.76	R4	Section 404
S025	35.326798	-89.421889	77.31	R4	Section 404
S027	35.323285	-89.420311	604.55	R4	Section 404
S028	35.330801	-89.406552	1212.03	R4	Section 404
S029	35.330598	-89.411835	324.28	R4	Section 404
S030	35.326797	-89.391083	3781.68	R5	Section 404
S032	35.333625	-89.381183	2845.93	R5	Section 404
S033	35.336972	-89.38059	4457.52	R5	Section 404
S034	35.334007	-89.38517	1019.13	R4	Section 404
S035	35.336263	-89.380686	380.39	R4	Section 404
S036	35.328218	-89.378072	461.72	R4	Section 404
S037	35.333091	-89.371806	2553.01	R4	Section 404
S038	35.336607	-89.376693	1348.42	R4	Section 404
S039	35.337249	-89.376345	144.36	R4	Section 404
S040	35.34203	-89.382543	2802.88	R4	Section 404
S041	35.342897	-89.38497	1061.27	R4	Section 404
S042	35.340402	-89.3881	461.84	R4	Section 404
S043	35.342177	-89.384072	361.01	R4	Section 404
S044	35.341499	-89.382937	185.02	R4	Section 404
S045	35.342177	-89.380382	263.9	R4	Section 404
S046	35.340718	-89.378233	563.74	R4	Section 404
S047	35.340357	-89.376793	105.54	R4	Section 404
S048	35.338966	-89.372091	164.55	R4	Section 404
S049	35.338851	-89.368166	94.48	R5	Section 404
S050	35.337343	-89.367361	788.08	R5	Section 404
S051	35.338407	-89.392691	1475.1	R4	Section 404
S052	35.308863	-89.388961	284.27	R4	Section 404
S053	35.312229	-89.396596	576.79	R4	Section 404
S054	35.313943	-89.391196	1645.54	R4	Section 404
S055	35.316021	-89.388028	376.5	R4	Section 404
S056	35.314944	-89.377936	1167.03	R4	Section 404
S057	35.341688	-89.392903	123.77	R4	Section 404
S058	35.32691	-89.412484	388.59	R4	Section 404
W09	35.328341	-89.447987	1.44	PEM	Section 404
W15	35.32271	-89.396686	1.08	PEM	Section 404
W17	35.323485	-89.413104	0.75	PFO	Section 404

RGL 16-01: TABLE OF AQUATIC RESOURCES IN REVIEW AREA WHICH "MAY BE" SUBJECT TO REGULATORY JURISDICTION					
Site number	Latitude (decimal degrees)	Longitude (decimal degrees)	Estimated amount of aquatic resource in review area (acreage and linear feet, if applicable)	Type of aquatic resource (i.e., wetland vs. non-wetland waters)	Geographic authority to which the aquatic resource "may be" subject (i.e., Section 404 or Section 10/404)
W18	35.324578	-89.411224	0.12	PEM	Section 404
W19	35.323116	-89.416767	10.28	PFO	Section 404
W22	35.334969	-89.383707	2.62	PEM	Section 404
W23	35.32908	-89.370597	0.72	PFO	Section 404
W26	35.336255	-89.364865	0.44	PFO	Section 404
W27	35.335953	-89.370792	4.3	PFO	Section 404
W28	35.329845	-89.374378	3.6	PFO	Section 404
W29	35.32619	-89.391614	1.19	PFO	Section 404
W30	35.327653	-89.393103	0.09	PFO	Section 404
W31	35.319968	-89.386769	0.1	PEM	Section 404
W32	35.306078	-89.395898	1.64	PFO	Section 404
W34	35.321098	-89.439284	0.23	PEM	Section 404
W35	35.326101	-89.444246	1.34	PEM	Section 404
W37	35.328233	-89.438567	3.6	PFO	Section 404
W38	35.325095	-89.450603	8.23	PFO	Section 404
W39	35.321168	-89.442351	0.05	PFO	Section 404
W41	35.332569	-89.377417	0.09	PFO	Section 404
W42	35.342487	-89.387983	0.3	PFO	Section 404
W43	35.340949	-89.39433	1.36	PFO	Section 404
W44	35.342095	-89.386048	0.11	PFO	Section 404
W45	35.339627	-89.37724	0.1	PEM	Section 404
W01	35.325348	-89.435821	0.42	PUB	Section 404
W03	35.315471	-89.386467	0.39	PUB	Section 404
W08	35.326836	-89.415564	0.36	PUB	Section 404
W10	35.318977	-89.433319	0.83	PUB	Section 404
W11	35.320723	-89.433431	1.93	PUB	Section 404
W12	35.319004	-89.431447	1.13	PUB	Section 404
W14	35.318519	-89.428978	1.22	PUB	Section 404
W16	35.316662	-89.395196	0.82	PUB	Section 404
W20	35.333399	-89.377411	1.55	PUB	Section 404
W21	35.330844	-89.397741	0.63	PUB	Section 404
W24	35.32786	-89.37044	0.2	PUB	Section 404
W25	35.330043	-89.366797	0.42	PUB	Section 404
W33	35.320606	-89.43898	0.36	PUB	Section 404
W36	35.325879	-89.437302	0.74	PUB	Section 404
W40	35.32118	-89.423647	0.3	PUB	Section 404

NOTIFICATION OF ADMINISTRATIVE APPEAL OPTIONS AND PROCESS AND REQUEST FOR APPEAL

Applicant: Yum Yum Solar LLC		File Number: MVM-2019-188	Date: 10/03/2019
Attached is:			See Section below
	INITIAL PROFFERED PERMIT (Standard Permit or Letter of permission)		A
	PROFFERED PERMIT (Standard Permit or Letter of permission)		B
	PERMIT DENIAL		C
	APPROVED JURISDICTIONAL DETERMINATION		D
X	PRELIMINARY JURISDICTIONAL DETERMINATION		E

SECTION I - The following identifies your rights and options regarding an administrative appeal of the above decision. Additional information may be found at http://www.usace.army.mil/cecw/pages/reg_materials.aspx or Corps regulations at 33 CFR Part 331.

A: INITIAL PROFFERED PERMIT: You may accept or object to the permit.

- ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.

- OBJECT: If you object to the permit (Standard or LOP) because of certain terms and conditions therein, you may request that the permit be modified accordingly. You must complete Section II of this form and return the form to the district engineer. Your objections must be received by the district engineer within 60 days of the date of this notice, or you will forfeit your right to appeal the permit in the future. Upon receipt of your letter, the district engineer will evaluate your objections and may: (a) modify the permit to address all of your concerns, (b) modify the permit to address some of your objections, or (c) not modify the permit having determined that the permit should be issued as previously written. After evaluating your objections, the district engineer will send you a proffered permit for your reconsideration, as indicated in Section B below.

B: PROFFERED PERMIT: You may accept or appeal the permit

- ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.

- APPEAL: If you choose to decline the proffered permit (Standard or LOP) because of certain terms and conditions therein, you may appeal the declined permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

C: PERMIT DENIAL: You may appeal the denial of a permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

D: APPROVED JURISDICTIONAL DETERMINATION: You may accept or appeal the approved JD or provide new information.

- ACCEPT: You do not need to notify the Corps to accept an approved JD. Failure to notify the Corps within 60 days of the date of this notice, means that you accept the approved JD in its entirety, and waive all rights to appeal the approved JD.

- APPEAL: If you disagree with the approved JD, you may appeal the approved JD under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

E: PRELIMINARY JURISDICTIONAL DETERMINATION: You do not need to respond to the Corps regarding the preliminary JD. The Preliminary JD is not appealable. If you wish, you may request an approved JD (which may be appealed), by contacting the Corps district for further instruction. Also you may provide new information for further consideration by the Corps to reevaluate the JD.

SECTION II - REQUEST FOR APPEAL or OBJECTIONS TO AN INITIAL PROFFERED PERMIT

REASONS FOR APPEAL OR OBJECTIONS: (Describe your reasons for appealing the decision or your objections to an initial proffered permit in clear concise statements. You may attach additional information to this form to clarify where your reasons or objections are addressed in the administrative record.)

ADDITIONAL INFORMATION: The appeal is limited to a review of the administrative record, the Corps memorandum for the record of the appeal conference or meeting, and any supplemental information that the review officer has determined is needed to clarify the administrative record. Neither the appellant nor the Corps may add new information or analyses to the record. However, you may provide additional information to clarify the location of information that is already in the administrative record.

POINT OF CONTACT FOR QUESTIONS OR INFORMATION:

If you have questions regarding this decision and/or the appeal process you may contact: Gregg Williams
USACE – Memphis District
Regulatory Branch
167 North Main Street B-202
Memphis, Tennessee 38103-1894
(901) 544-0736

If you only have questions regarding the appeal process you may also contact: Administrative Appeals Review Officer
USACE – Mississippi Valley Division
P.O. Box 80
Vicksburg, MS 39181-0080
(601) 634-5820

RIGHT OF ENTRY: Your signature below grants the right of entry to Corps of Engineers personnel, and any government consultants, to conduct investigations of the project site during the course of the appeal process. You will be provided a 15 day notice of any site investigation, and will have the opportunity to participate in all site investigations.

Signature of appellant or agent.	Date: 10/09/2019	Telephone number: 312-582-1293

June 21, 2019

Mr. Lew Hoffmann
TDEC – Division of Water Resources
Memphis Environmental Field Office
8383 Wolf Lake Drive
Bartlett, TN 38133

Subject: **Yum Yum Solar Project**
Hydrologic Determination Request
Yum Yum, Fayette County, Tennessee

To Whom It May Concern:

Yum Yum Solar LLC (Yum Yum Solar), a subsidiary of Invenergy Solar Project Development LLC (Invenergy), intends to develop a site in Fayette County, Tennessee as a photovoltaic (PV) solar power generating facility. The proposed Yum Yum Solar project area ("Project Area") would occupy portions of 25 individual tracts, which in their entirety encompass nearly 2,876 contiguous acres in rural Fayette County, Tennessee, southwest of the unincorporated community of Yum Yum (Appendix A, Figures 1 and 2). On behalf of its subsidiary Yum Yum Solar, Invenergy has authorized HDR Engineering, Inc. (HDR) as its agent to submit the enclosed Hydrologic Determination (HD) request for written approval from the Tennessee Department of Environmental Conservation (TDEC) regarding the extent of wetland weather conveyance (WWC) features within the Project Area.

	Requestor	Consultant/Requestor	Current Property Owners
Name	Ariel Kondiles	Kelly Thames, PWS, TN-QHP-IT	See Figure 3 (Appendix A) and Table 1 (Appendix B)
Affiliation	Yum Yum Solar, LLC	HDR	
Mailing Address	One South Wacker Drive, Suite 1800 Chicago, IL 60606	440 S. Church Street Suite 1000 Charlotte, NC 28202	
Phone Number	312-638-8508	704-338-6710	

Project Location: Both sides of Stanton Road, north of Highway 59 in Fayette County, TN
Basin: Loosahatchie River (Hydrologic Unit Code [HUC] 08010209)
City: Memphis
County: Fayette County
Center Decimal Degree Coordinates of Project Area: 35.3261°, -89.4046°
USGS Quadrangle Name: Lambert, TN and Laconin, TN (1997)

Project Area Description and Recent Weather Conditions

Invenergy has secured rights from the owners of 25 individual parcels to construct the proposed solar facility on their properties. Existing landowner and parcel information summarized in Appendix B and depicted on Figure 3 (Appendix A). Land use within the Project Area consists of primarily of agricultural land with forested field margins and drainageways.

440 South Church Street, Suite 1000, Charlotte, NC 28202-2075
T 704.338.6700 **F** 704.338.6761

The Project Area is located in the Laurel Creek Canal sub-watershed (12-digit Hydrologic Unit Code [HUC] 080102090401), Little Cypress Creek Canal sub-watershed (HUC 12 -080102090402), and Big Muddy Creek Upper sub-watershed (HUC 12-080102080401) in the Loosahatchie Watershed (HUC-8 08010209) (Appendix A, Figure 4). The Laurel Creek Canal drains southeast from the Project Area to its confluence with the Loosahatchie River approximately six miles southeast of the Project Area.

The U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) provides wetlands data and analysis available to the public. A review of the USFWS NWI depicts the potential presence of wetlands within the Project Area (Appendix A, Figures 5A and 5B). The U.S. Geological Survey (USGS) National Hydrography Dataset (NHD) provides digital geospatial datasets to the public that map a network of surface waters and catchments of the U.S. A review of the USGS NHD also depicts the potential presence of a number of stream channels within the Project Area (Appendix A, Figure 5).

According to the Natural Resources Conservation Services (NRCS) Soils of Fayette County (Figure 6A-6C, Appendix A), on-site soils consist of 46 soils mail units, which are summarized in Table 1 (Appendix C). The NRCS's National Hydric Soils List classifies Henry silt loam (He), Henry silt loam, terrace (HeT), and Wavery silt loam (Wv) as hydric for Fayette County (NRCS 2019b). Soil map units and corresponding hydric ratings are included in Figure 6A – 6C (Appendix A).

Precipitation data was reviewed in accordance with TDEC Division of Water Pollution Control Guidance for Making Hydrologic Determinations (Version 1.4) (TDEC 2011) prior to field mobilizations to determine the baseline hydrologic conditions at the time of the field survey. Based on TDEC guidanceprecipitation for the Project Area was identified as Wet at the time of both the November and March mobilizations, with a multi-month score of 15, and Normal at the time of the January mobilization, with a multi-month score of 12. Table 1 (below) summarizes the recent weather conditions for the Project Area for the 3-month period prior to each field mobilization.

Table 1. Precipitation Data Evaluation

November 2018 Mobilization			
	First Prior Month	Second Prior Month	Third Prior Month
Criteria – values are in inches	October-18	September-18	August-18
Estimated Precipitation Total	2.53	8.49	4.12
Minus 1 Std. Deviation	1.68	1.48	1.32
Average Precipitation	3.77	3.90	2.71
Plus 1 Std. Deviation	5.86	6.32	4.10
Type of Month (Dry, Normal, Wet)	Normal	Wet	Wet
Monthly Score	3 * 2 = 6	2 * 3 = 6	1 * 3 = 3
Overall Wetness:	15 (Wet)		
6 to 9 (Dry), 10 to 14 (Normal) 15 to 18 (Wet)			
January 2019 Mobilization			
	December-18	November-18	October-18
Estimated Precipitation Total	6.38	5.20	2.53
Minus 1 Std. Deviation	1.82	2.75	1.68
Average Precipitation	5.20	5.18	3.77
Plus 1 Std. Deviation	8.58	7.61	5.86
Type of Month (Dry, Normal, Wet)	Normal	Normal	Normal
Monthly Score	3 * 2 = 6	2 * 2 = 4	1 * 2 = 2
Overall Wetness:	12 (Normal)		
6 to 9 (Dry), 10 to 14 (Normal) 15 to 18 (Wet)			
March 2019 Mobilization			
	Fabruary-19	January-19	December-18
Estimated Precipitation Total	9.99	5.15	6.38
Minus 1 Std. Deviation	1.89	1.35	1.82
Average Precipitation	4.25	4.33	5.20
Plus 1 Std. Deviation	6.61	7.31	8.58
Type of Month (Dry, Normal, Wet)	Wet	Normal	Normal
Monthly Score	3 * 3 = 9	2 * 2 = 4	1 * 2 = 2
Overall Wetness:	15 (Wet)		
6 to 9 (Dry), 10 to 14 (Normal) 15 to 18 (Wet)			

Delineation of Wetlands and Waters

On November 11-16, 2018 and January 13-18 and March 12-13, 2019, HDR environmental scientists Kelly Thames, Professional Wetland Scientist (PWS), Tennessee Qualified Hydrologic Professional in Training (TN-QHP-IT), Mike Swenson, and Katy Leuth conducted field delineations of the Project Area for waters of the U.S. under Section 404 of the Clean Water Act (CWA). Potential jurisdictional waters of the U.S. were delineated according to the methodology and guidance described in the U.S. Army Corps of Engineers (USACE) 1987 Wetland Delineation Manual, USACE Post-Rapanos guidance, and the 2012 USACE Atlantic and Gulf Coastal Plain Regional Supplement (Version 2.0). Streams were classified utilizing the methodology and guidance provided in Regulatory Guidance Letter (RGL) 05-05 and the Tennessee Department of Environment and Conservation (TDEC) Division of Water Pollution Control Guidance for Making Hydrologic Determinations (Version 1.4) (TDEC 2011). Potentially jurisdictional waters of the U.S. were mapped using a Trimble® Geo7X GPS unit capable of sub-meter accuracy. GPS points were post-processed utilizing Trimble® GPS Pathfinder Office software.

In addition, on-site WWCs, which are not considered jurisdictional by the USACE, were delineated and classified using the TDEC Division of Water Pollution Control Guidance for Making Hydrologic Determinations (Version 1.4). These features were also mapped using a Trimble® Geo7X GPS unit.

Results

The results of the on-site field investigation conducted by HDR indicate that there are 24 wetlands (43.81 acres), 55 streams (67,179 linear feet), 15 open waters (11.31 acres), and 105 WWCs (55,180 linear feet) located within the Project Area (Figure 7). A summary of waters within the Project Area is provide in Table 1 (below).

Table 2. Summary of on-site aquatic resources

Type of Water	Flow Regime	Length (linear feet)	Area (acres)
Potentially USACE Jurisdictional Features			
Streams	Perennial	35,982	--
	Intermittent	31,197	--
Ponds	--	--	11.32
Wetlands	--	--	43.81
Non-Jurisdictional Features			
Wet Weather Conveyances	--	55,180	
	Total:	**122,359 lf**	**55.13 ac.**

<u>Potentially Jurisdictional Features</u>

Non-Wetland Waters

On-site non-wetland waters total approximately 67,179 linear feet of potentially jurisdictional stream channel and 11.32 acres of jurisdictional, impounded open waters Figure 7 (Appendix A). A summary of

on-site non-wetland waters is provided in Appendix D (Tables 1 and 2) and representative photographs are provided in Appendix G.

Wetland Waters

On-site wetland waters total 43.81 acres, consisting of 24 potentially jurisdictional wetlands (Figure 7, Appendix A). A summary of jurisdictional wetland waters is provided in Appendix D (Table 3) and representative wetland photographs are provided in Appendix G.

Non-Jurisdictional Features

Wet Weather Conveyances

On-site, non-jurisdictional features consist of 105 WWCs, totaling 55,180 linear feet. A summary of WWC features is provided in Table 1 (Appendix E). Hydrologic Determination Field Data Sheets are provided in Appendix F and representative photographs of wet weather conveyances are provided in Appendix G.

On behalf of Yum Yum Solar, HDR is hereby requesting a HD for wet weather conveyances identified within the Project Area. Should you have any questions or require additional information following your review of the enclosed materials, please contact Kelly Thames at (704) 338-6710 or kelly.thames@hdrinc.com.

Sincerely,

Kelly Thames, PWS, TN-QHP-IT
Environmental Scientist

Thomas Blackwell, PWS
Project Manager

Attachments:
- Appendix A – Figures
- Appendix B – Property Owner Information
- Appendix C – On-Site Soils
- Appendix D – Potentially Jurisdictional Waters
- Appendix E – Non-Jurisdictional Wet Weather Conveyances
- Appendix F – Hydrologic Determination Field Data Sheets
- Appendix G – Representative Site Photographs

cc: John Aquilino, Invenergy, LLC

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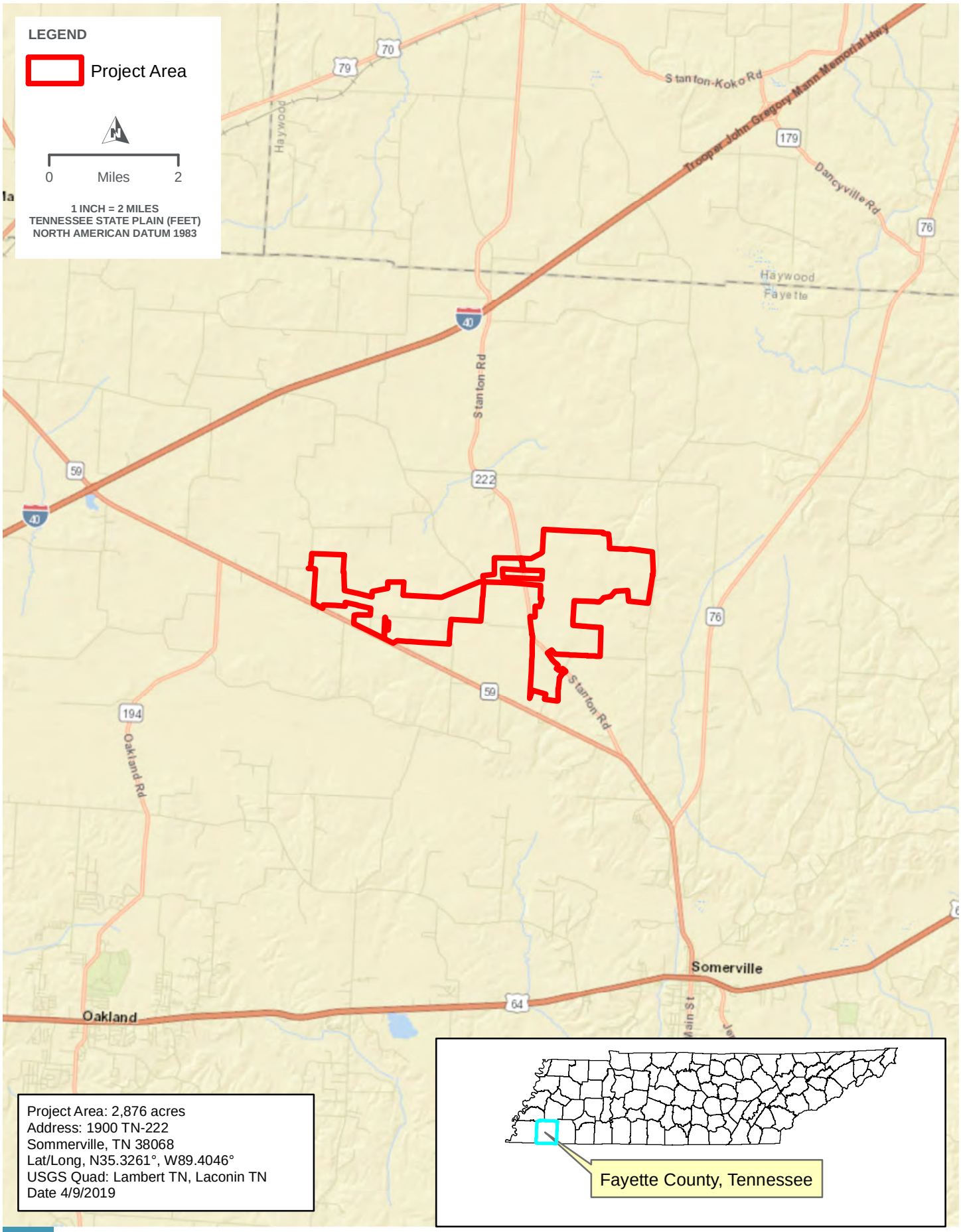
Appendix A

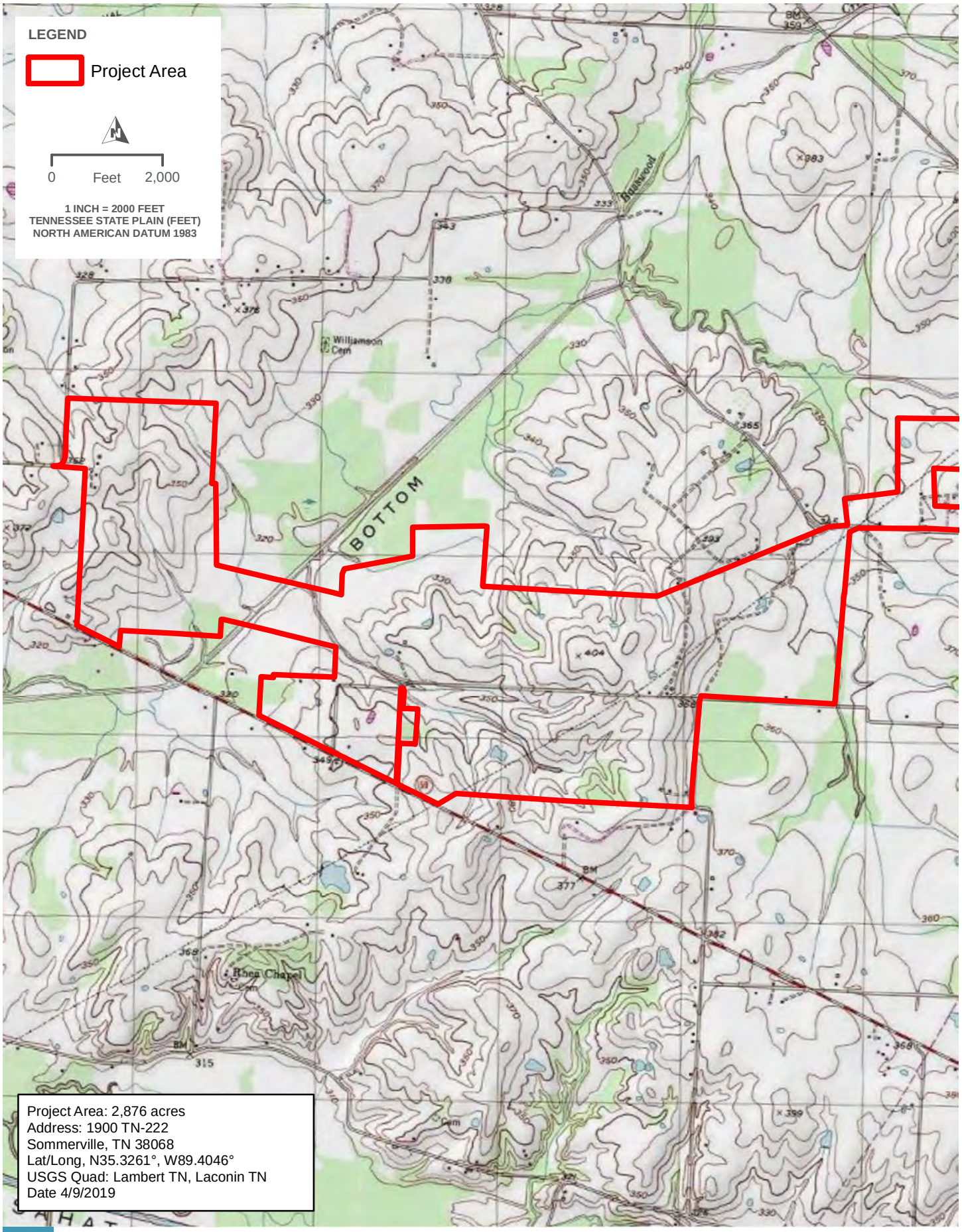
Figures



YUM YUM SOLAR SITE

PROJECT LOCATION

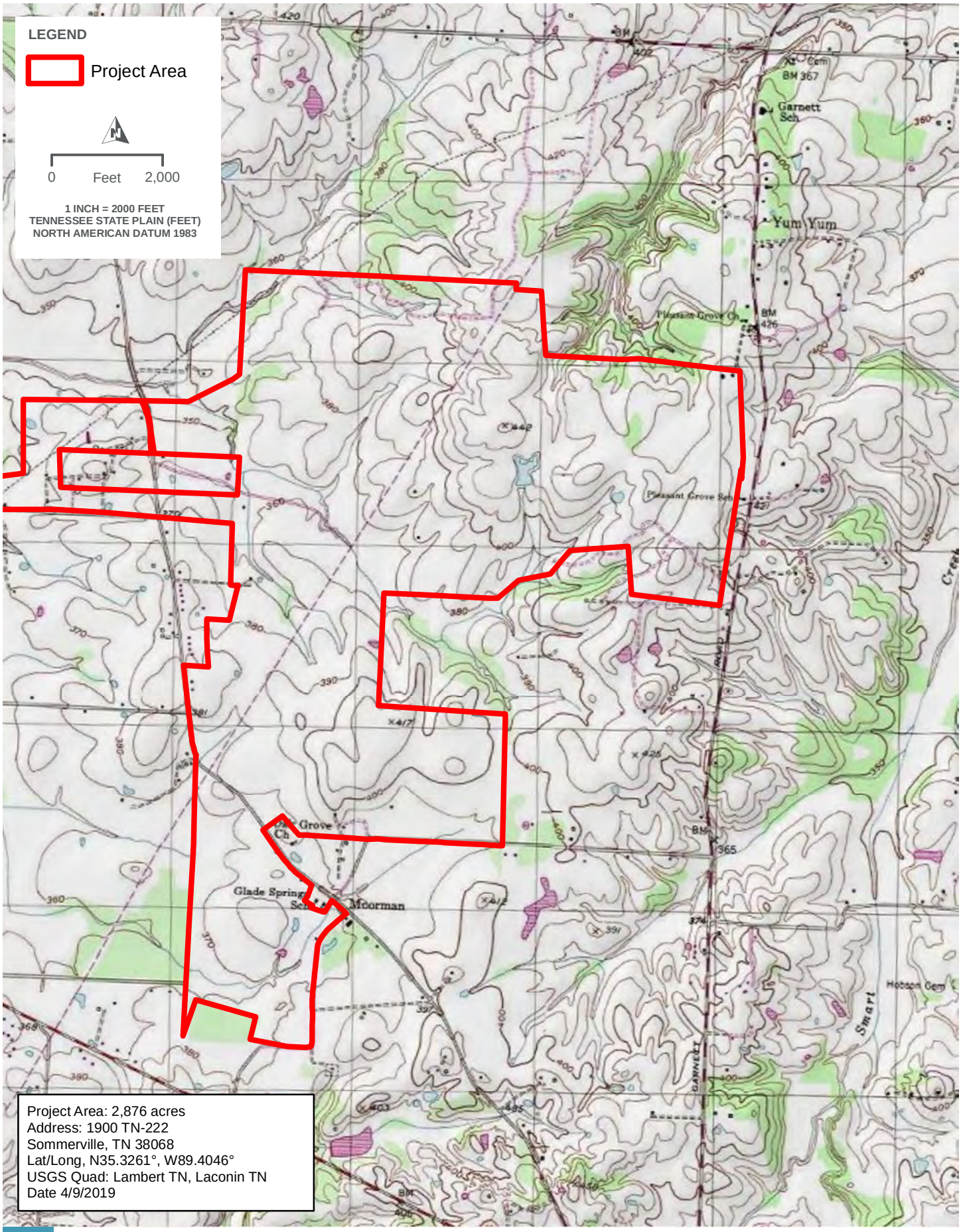
FIGURE 1



YUM YUM SOLAR SITE

USGS TOPOGRAPHIC QUADRANGLE

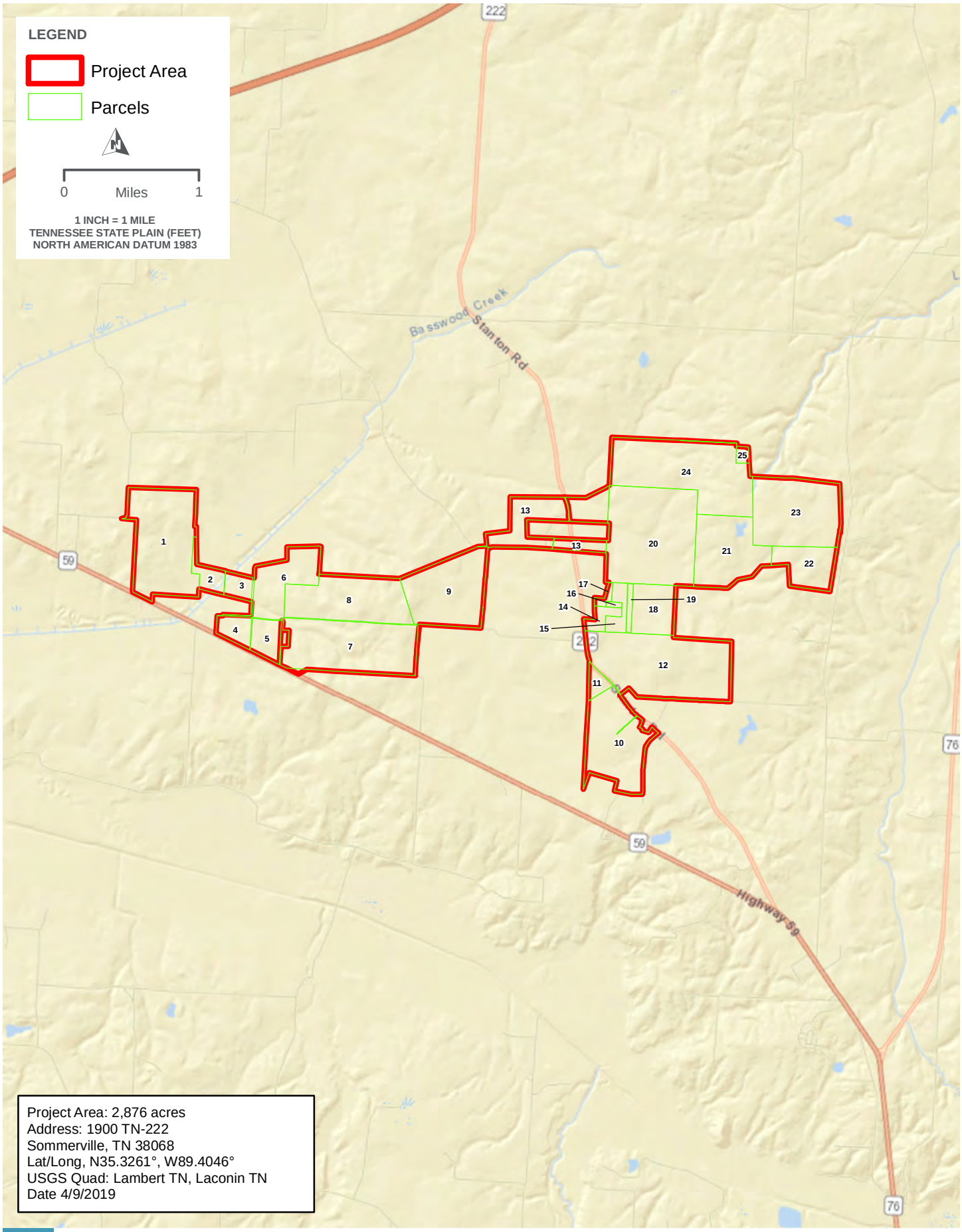
FIGURE 2A



YUM YUM SOLAR SITE

USGS TOPOGRAPHIC QUADRANGLE

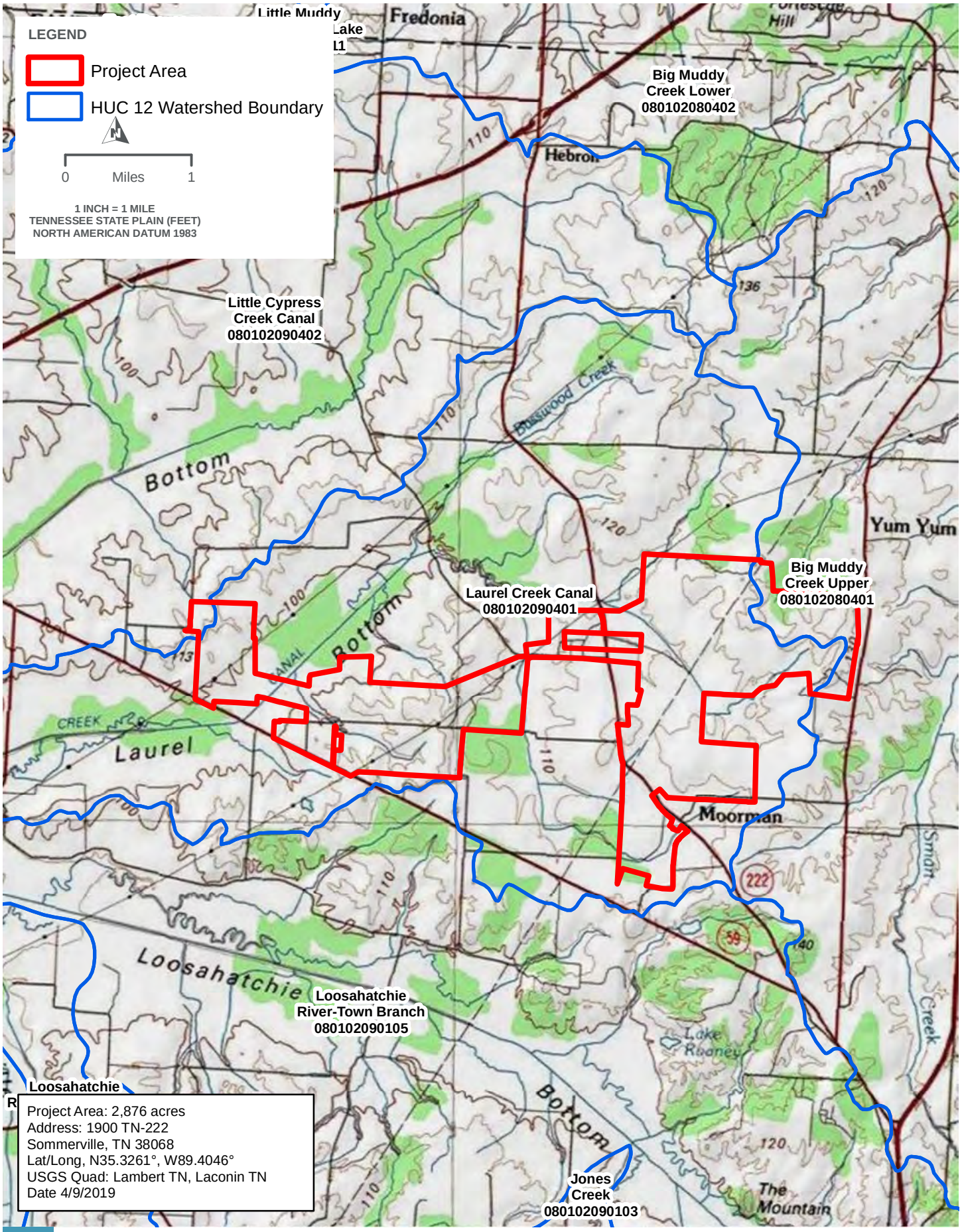
FIGURE 2B



YUM YUM SOLAR SITE

PARCEL MAP

FIGURE 3



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YUM YUM SOLAR SITE

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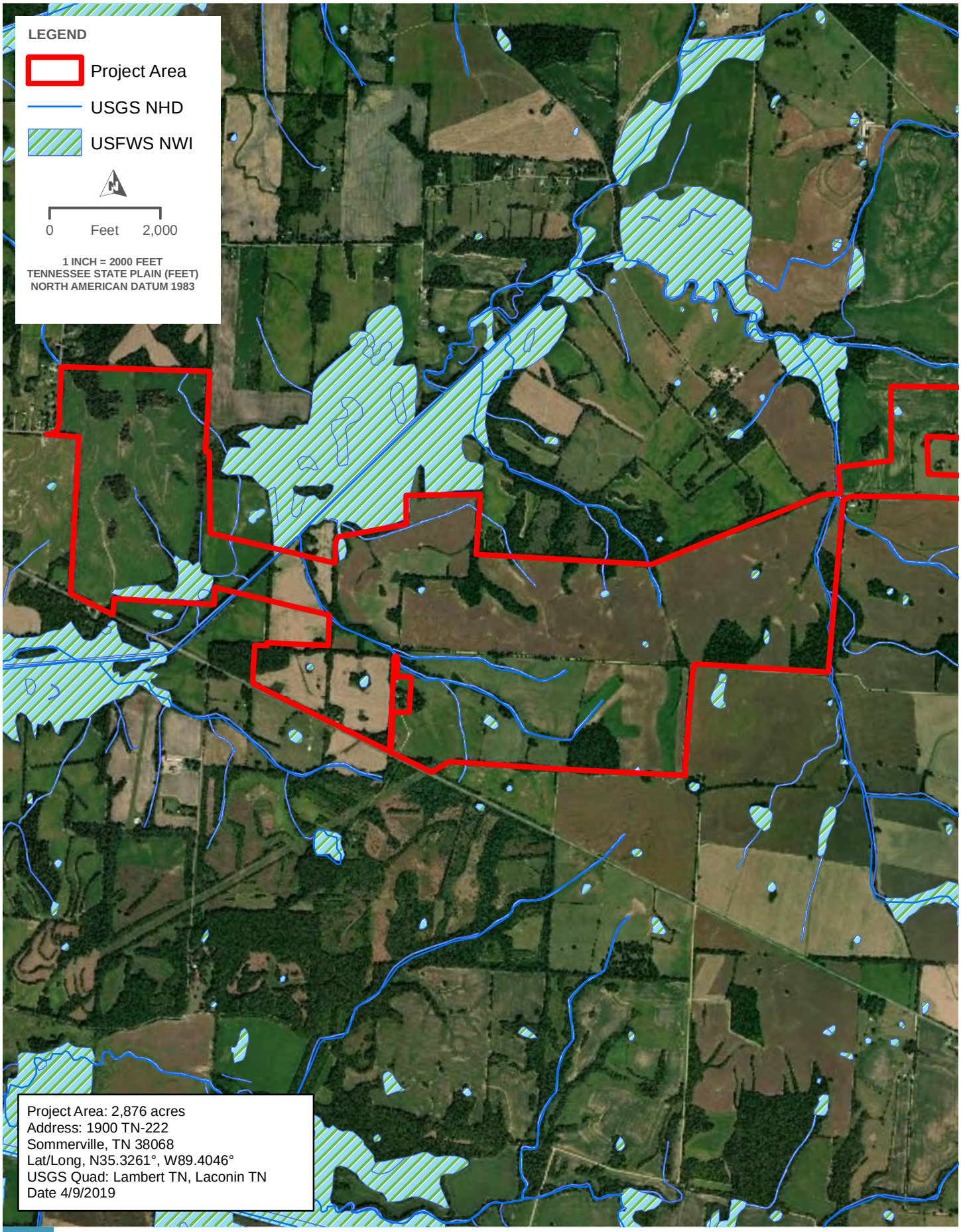
FIGURE 4



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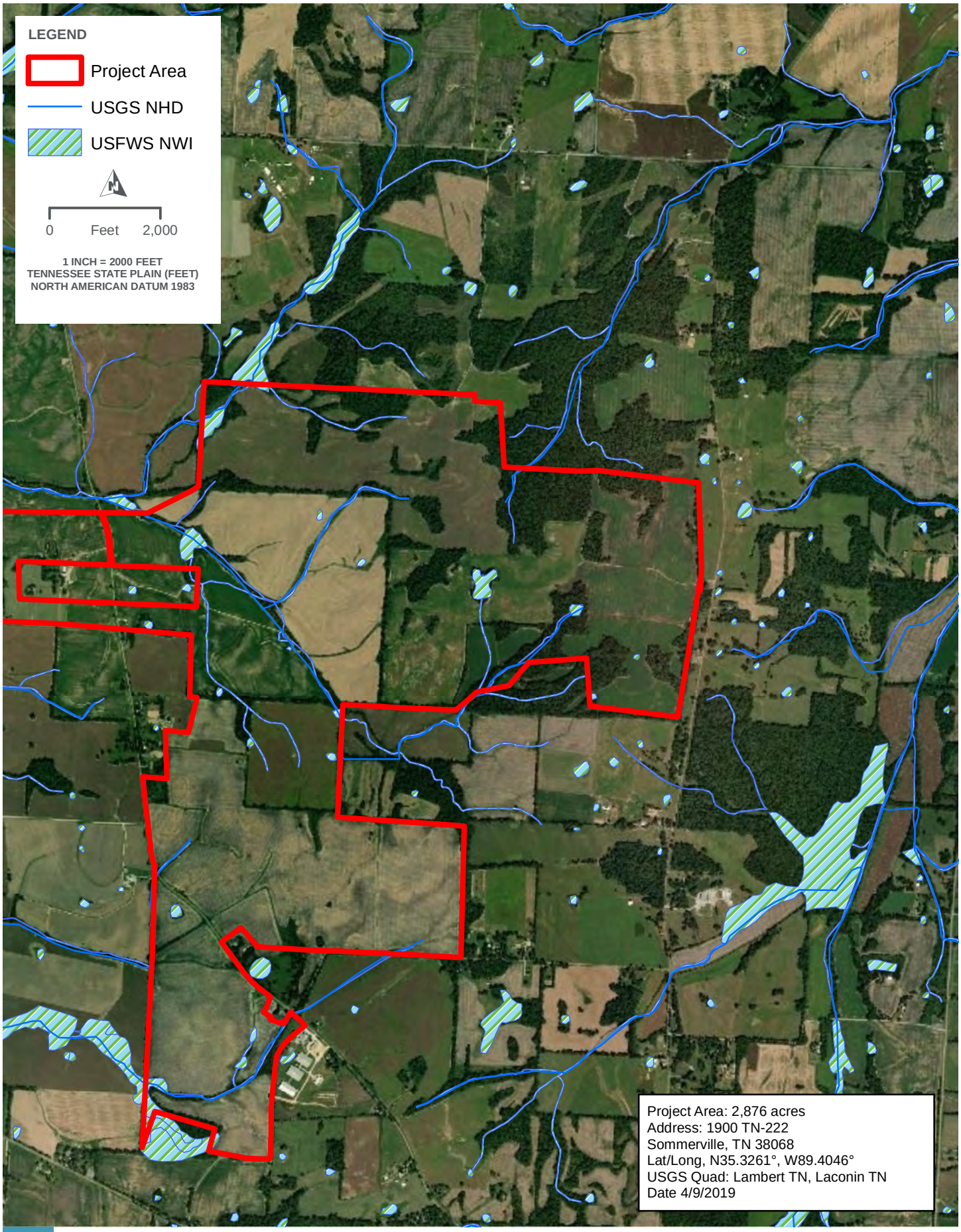
YUM YUM SOLAR SITE

NWI AND NHD DATASETS

FIGURE 5A

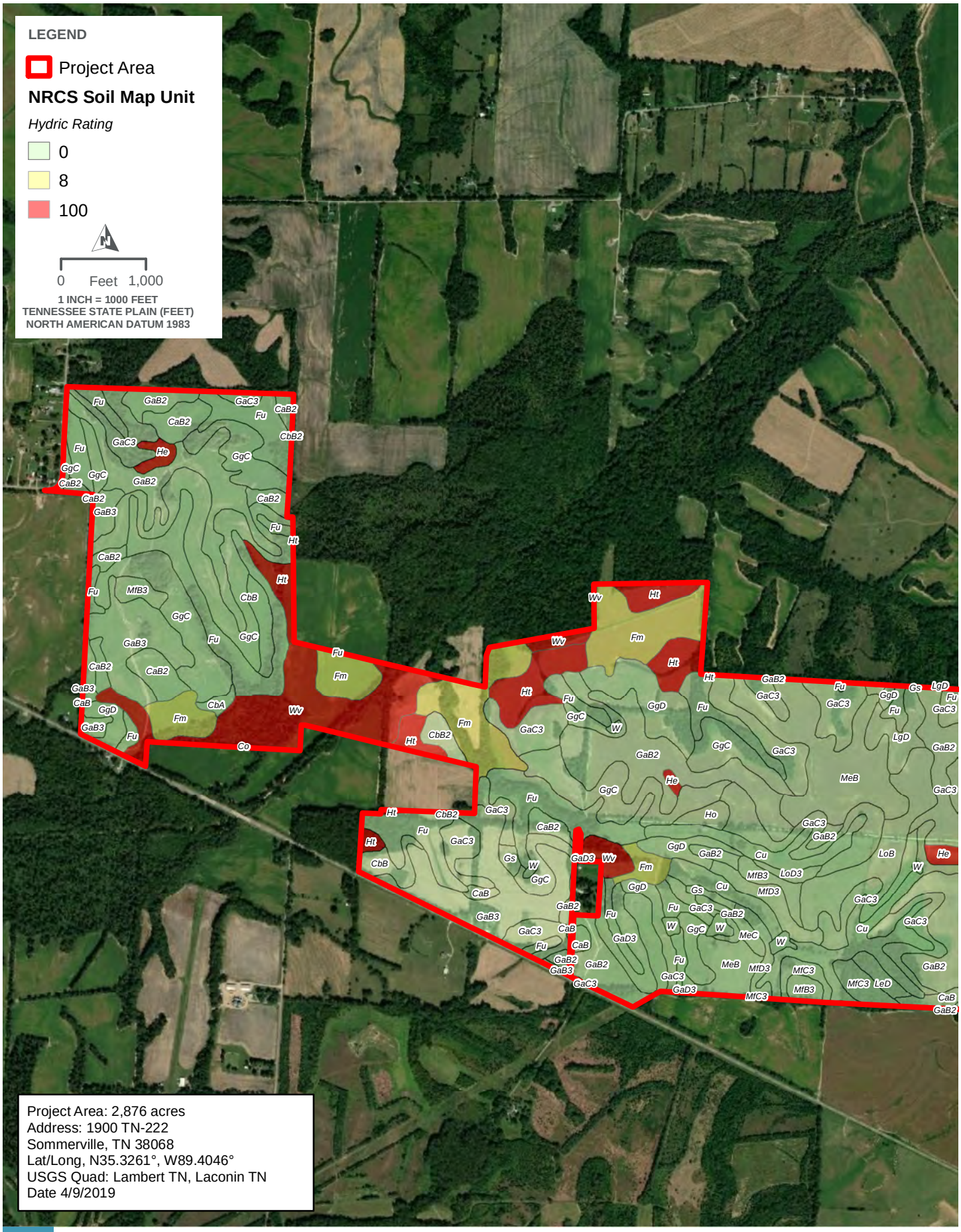


HDR

YUM YUM SOLAR SITE

NWI AND NHD DATASETS

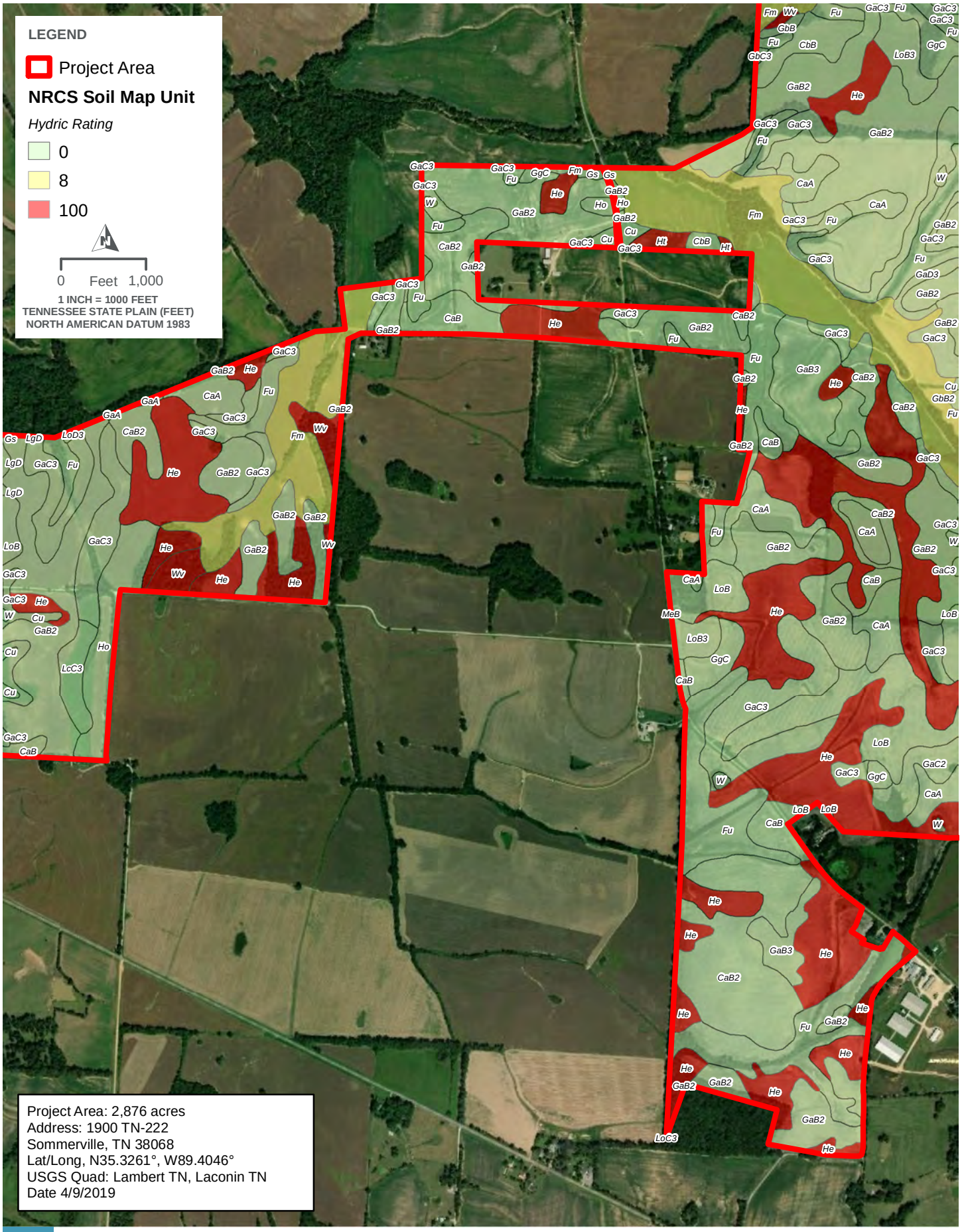
FIGURE 5B



YUM YUM SOLAR SITE

NRCS SOIL SURVEY AND HYDRIC RATINGS MAP

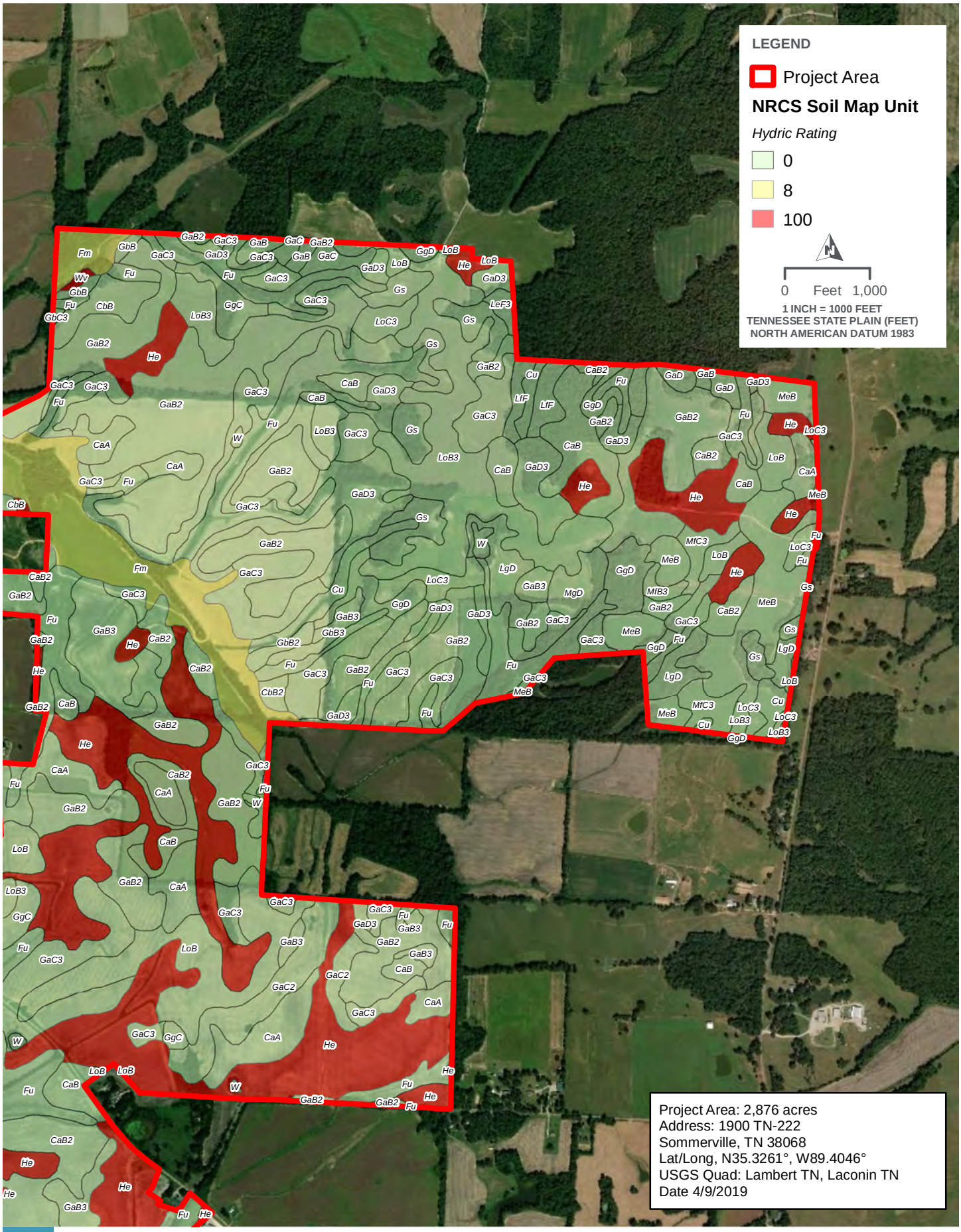
FIGURE 6A



YUM YUM SOLAR SITE

NRCS SOIL SURVEY AND HYDRIC RATINGS MAP

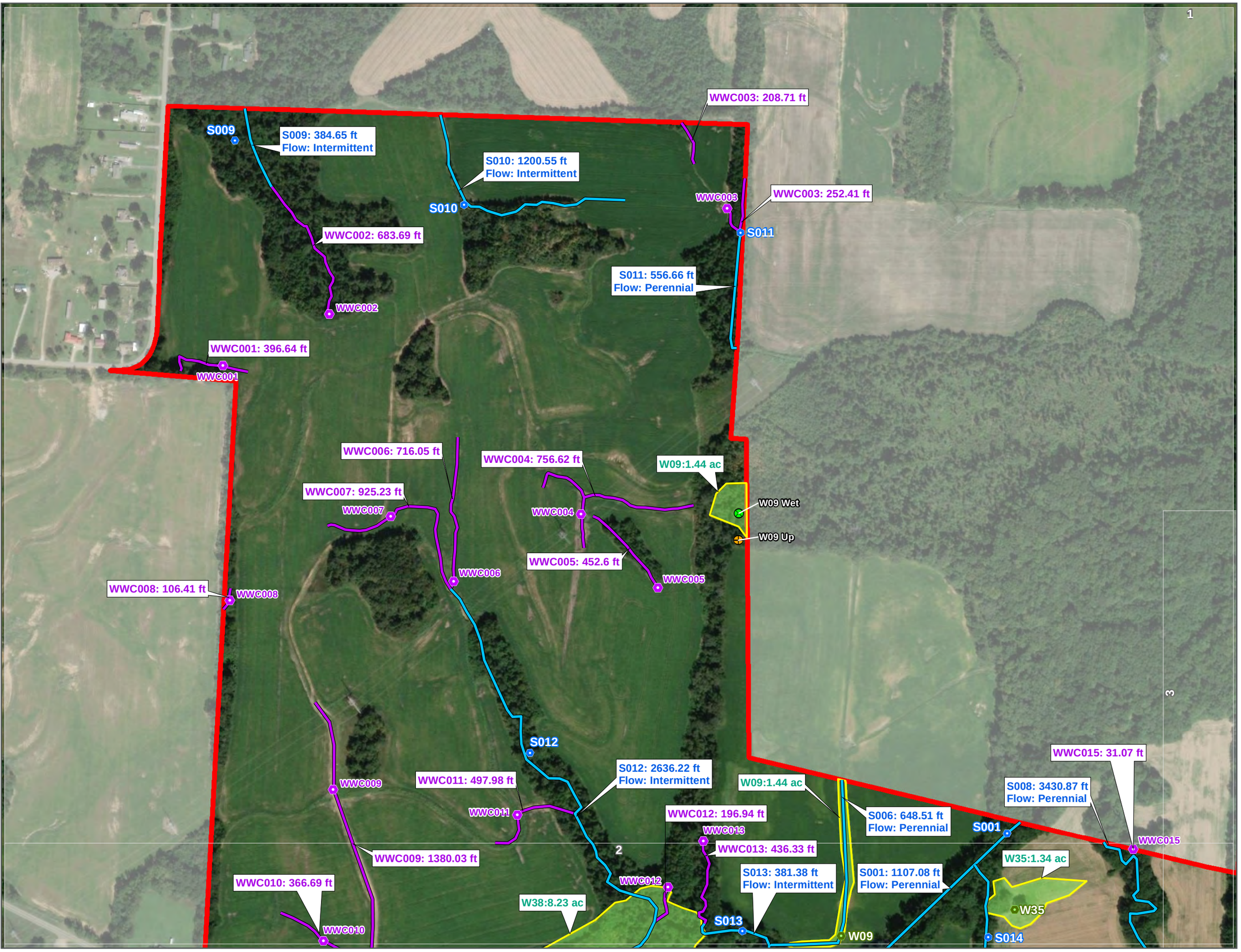
FIGURE 6B

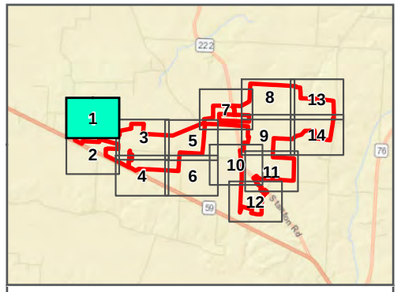


YUM YUM SOLAR SITE

NRCS SOIL SURVEY AND HYDRIC RATINGS MAP

FIGURE 6C





LEGEND

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- Delineated WWC
- Wetland Photo Points
- Stream Photo Points
- WWC Photo Points
- Page Extents

Data Points

- Upland
- Wetland

DATA SOURCES: HDR 2019 and ESRI 2016 Imagery.

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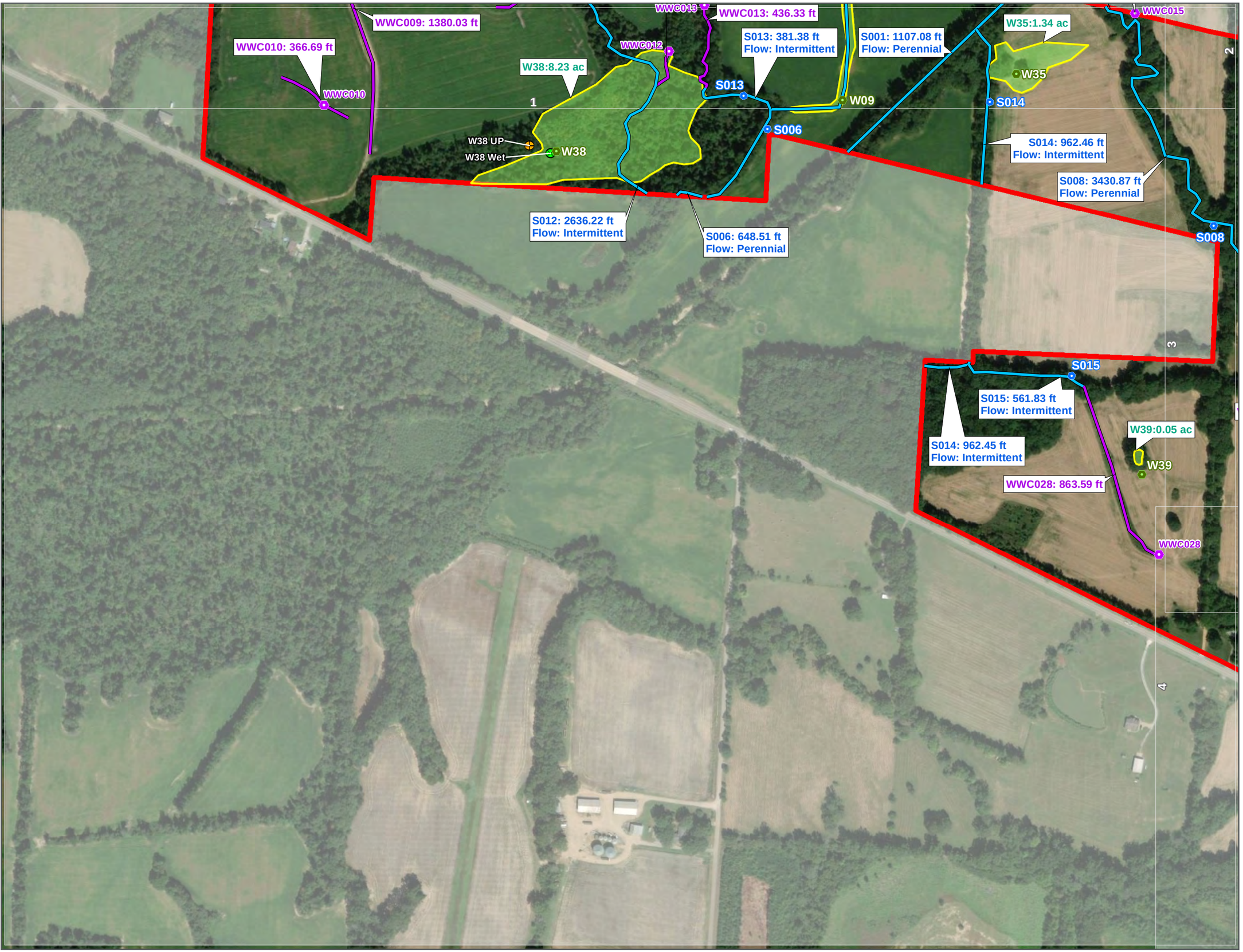
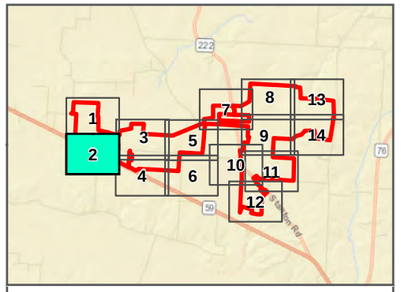
YUM YUM SOLAR SITE
DELINEATED FEATURES
FIGURE 7

WETLAND DETERMINATION AND WETLAND/WATERBODY FIELD DELINEATION REPORT





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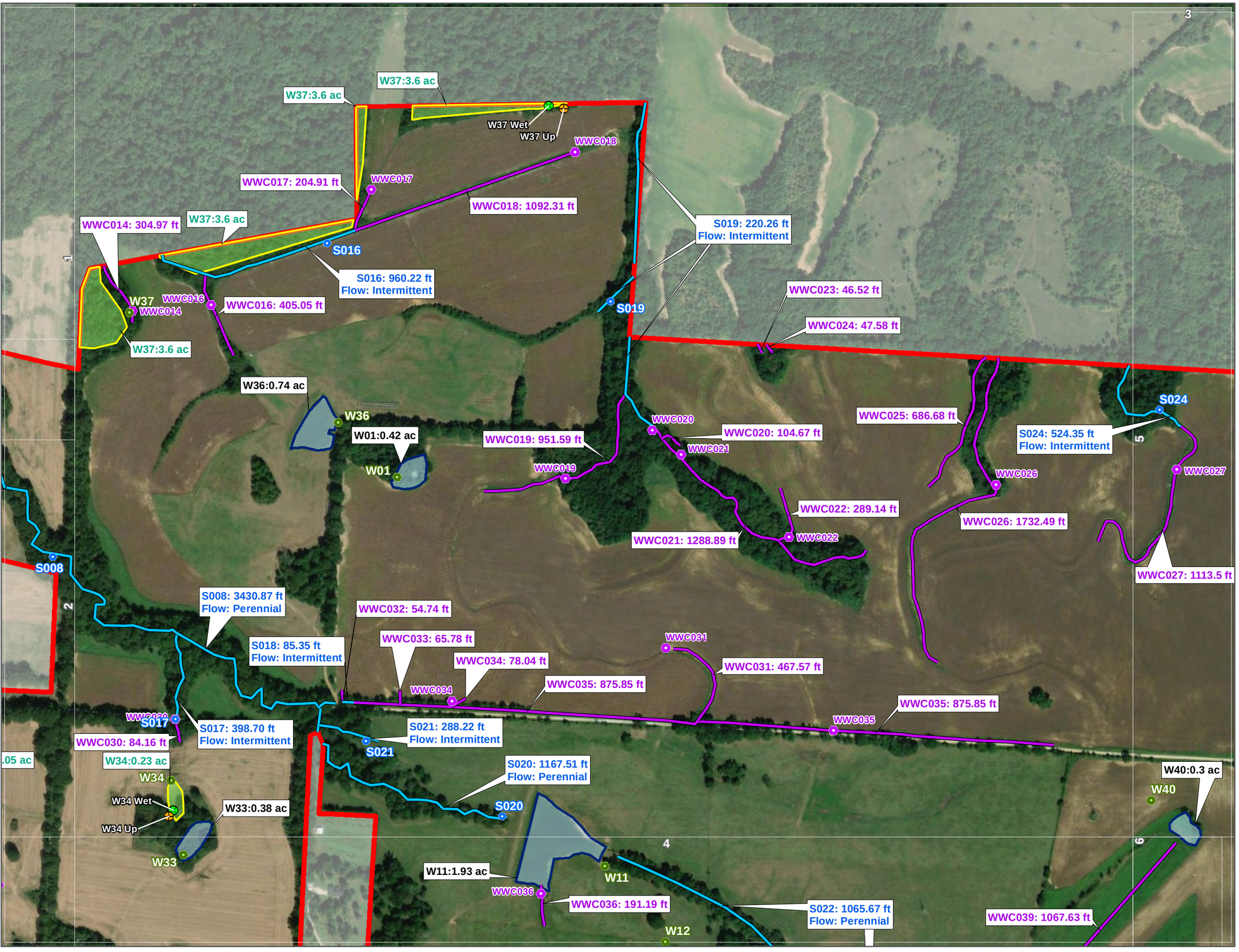

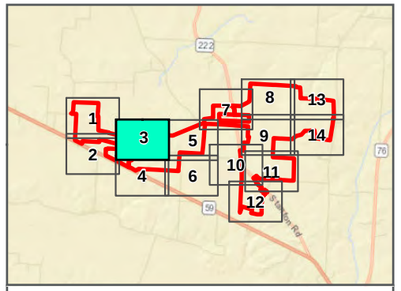

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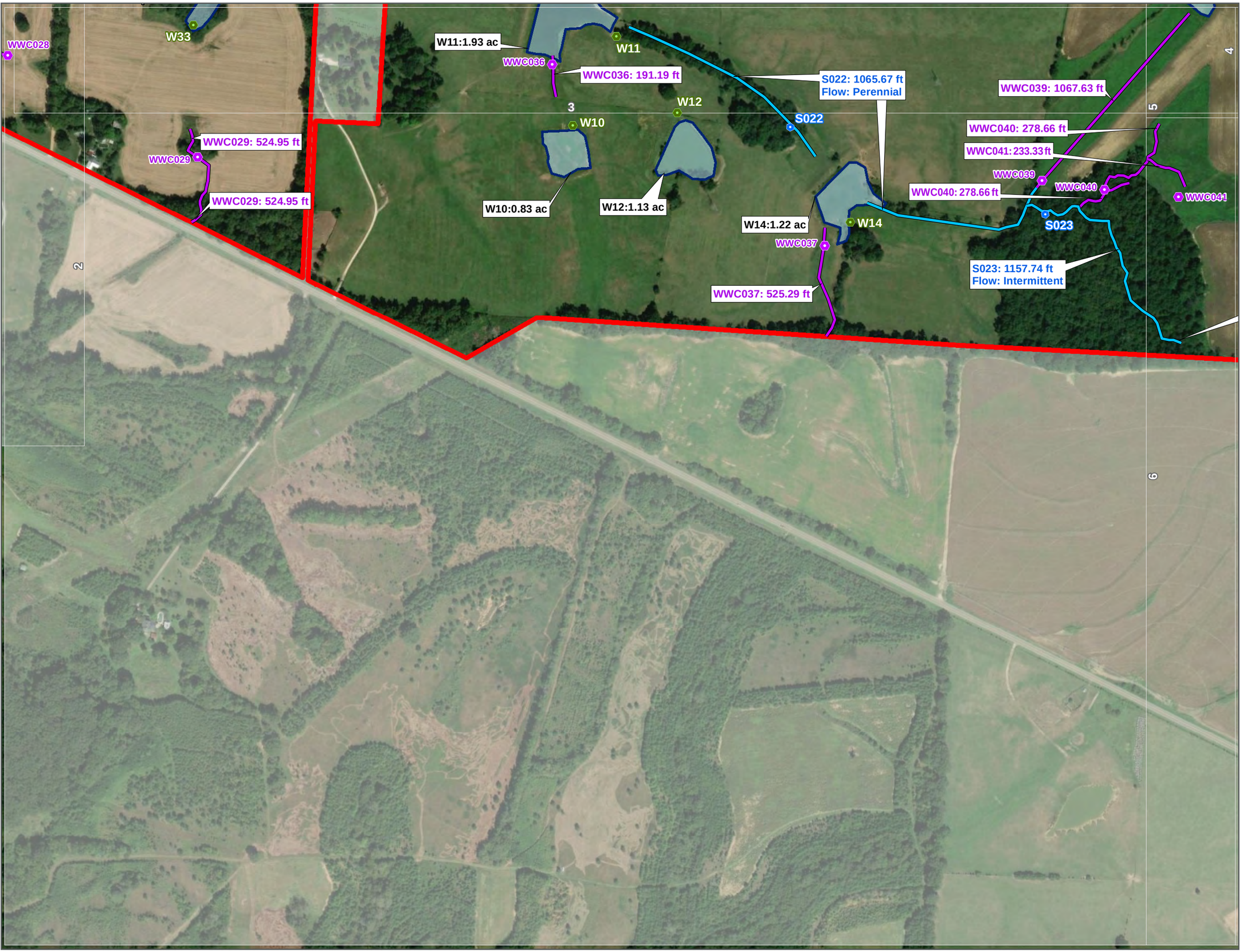

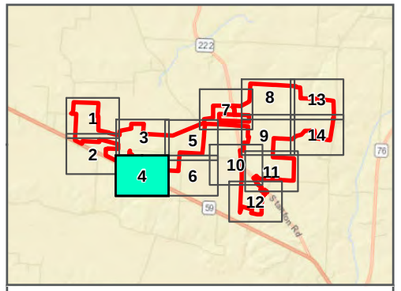

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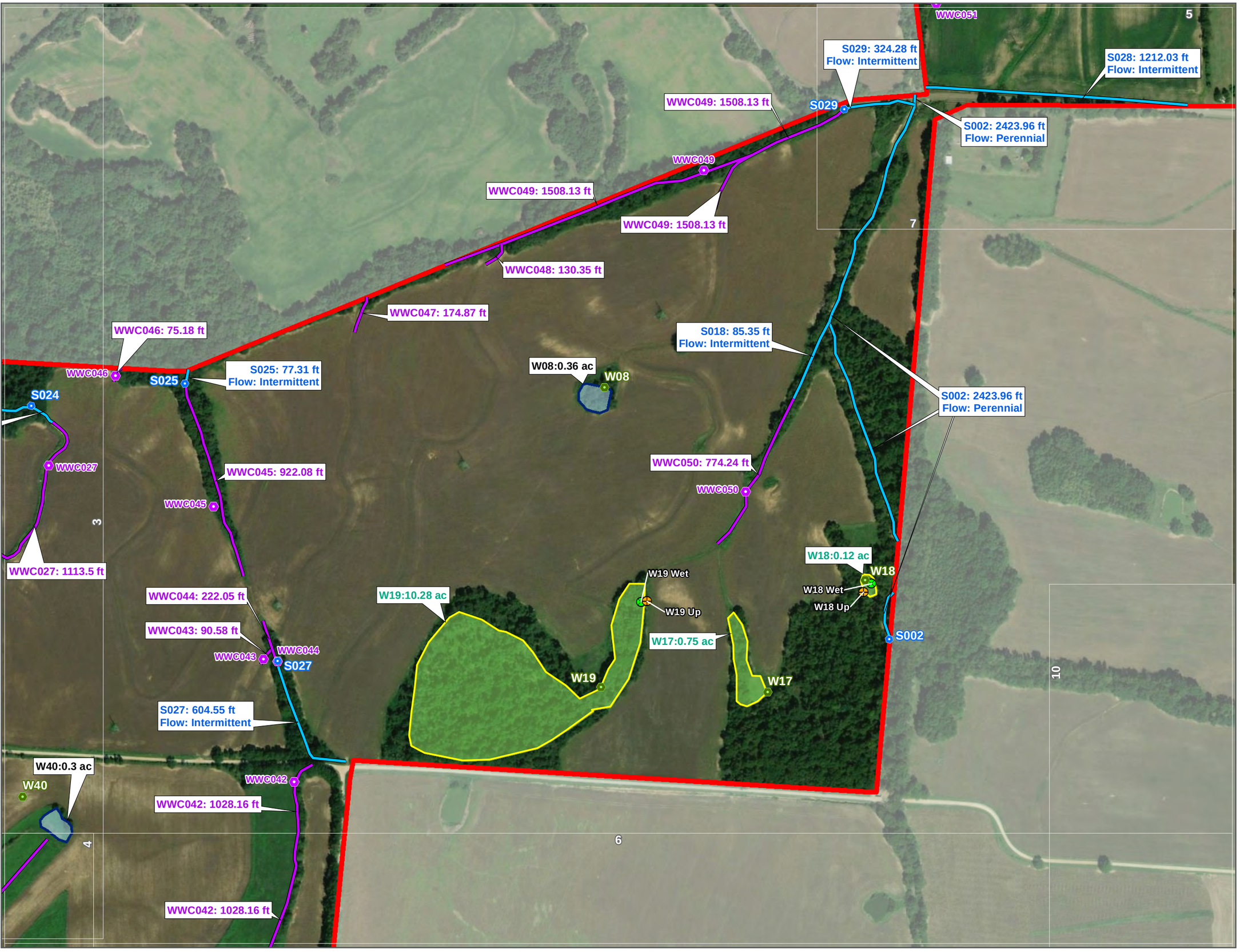

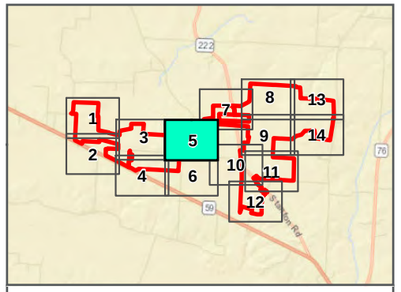

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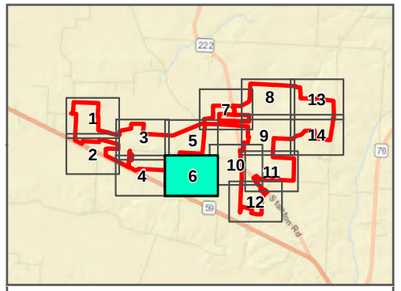

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Page 6 of 14

YUM YUM SOLAR SITE
DELINEATED FEATURES
FIGURE 7

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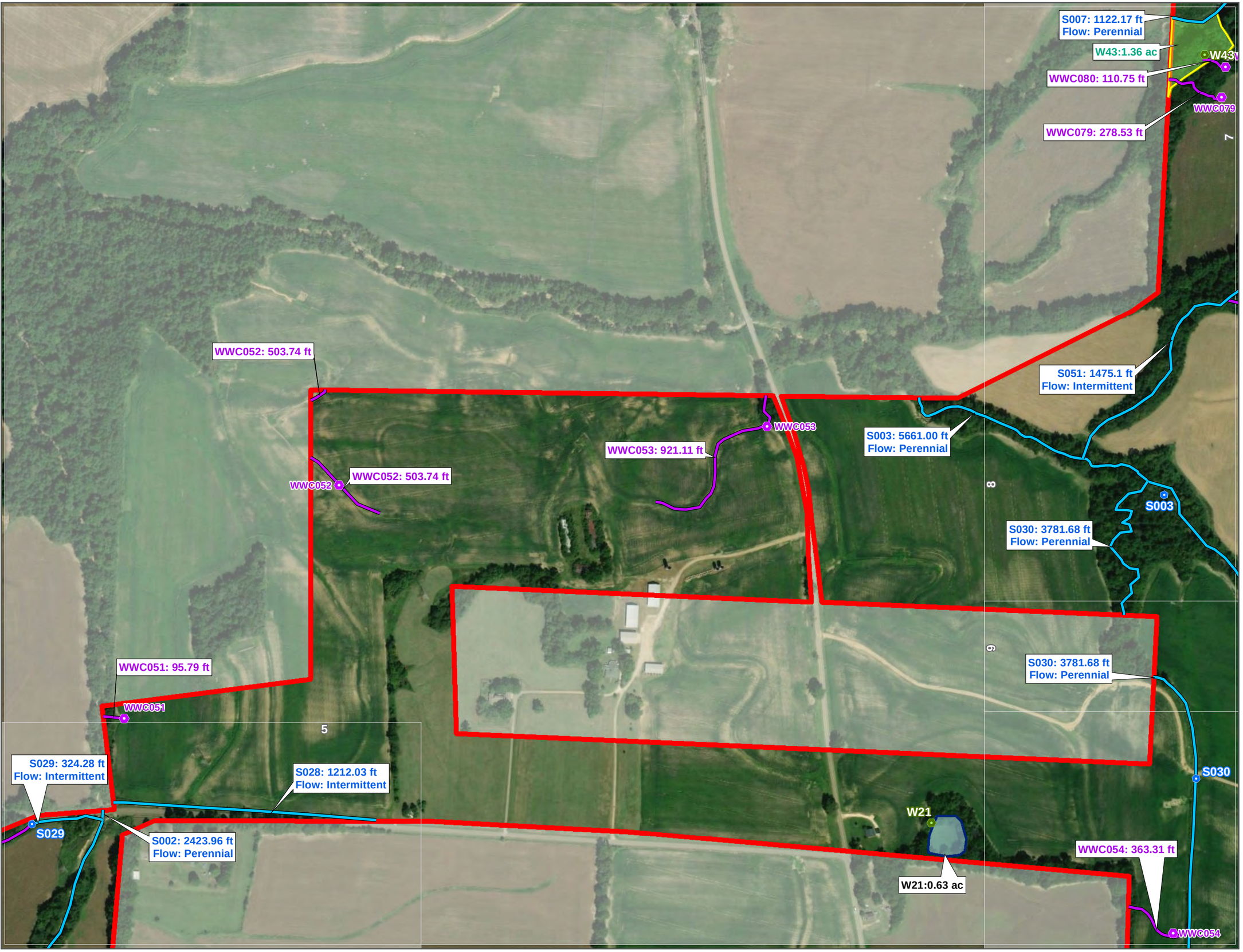

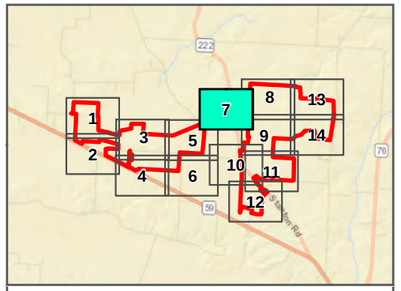

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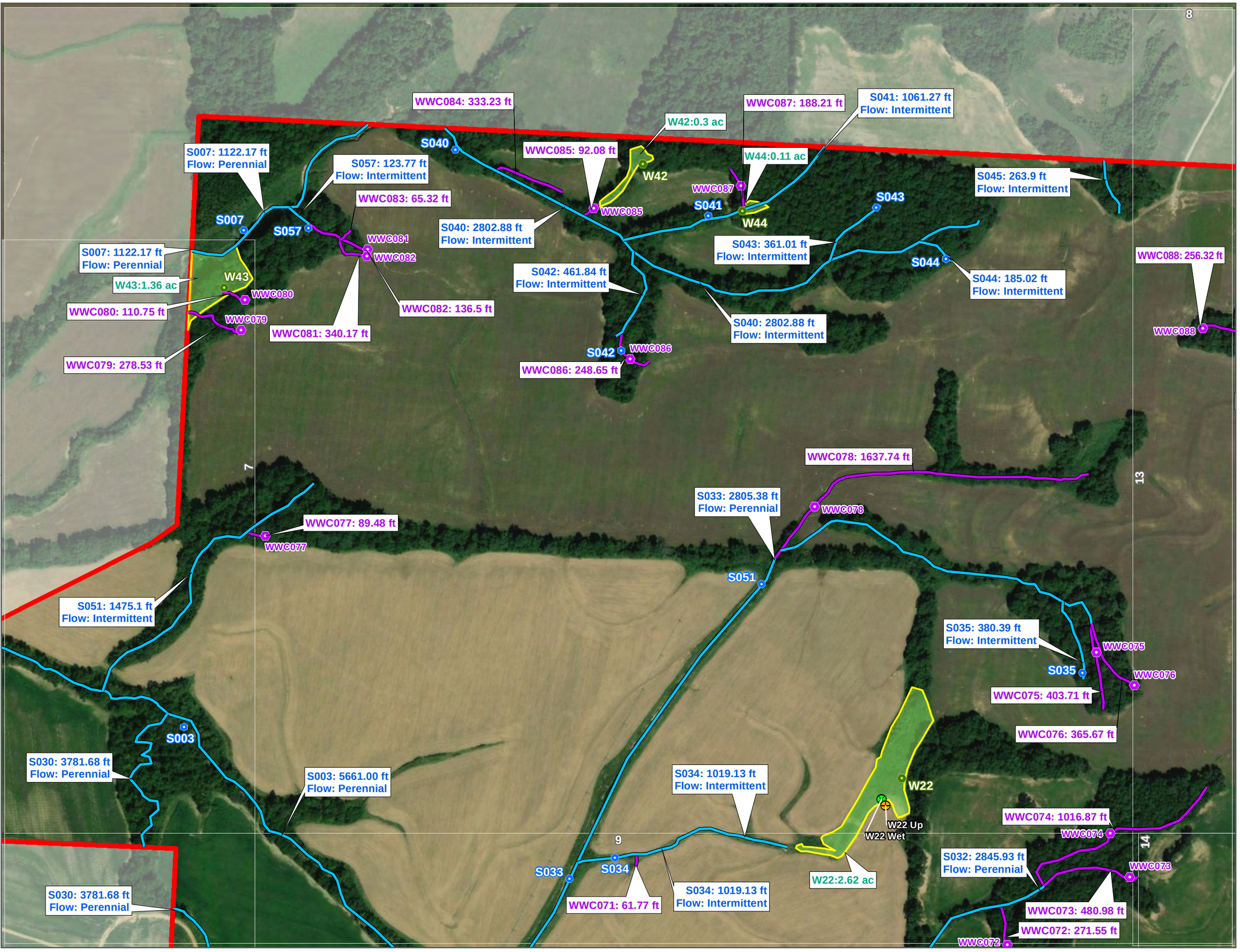

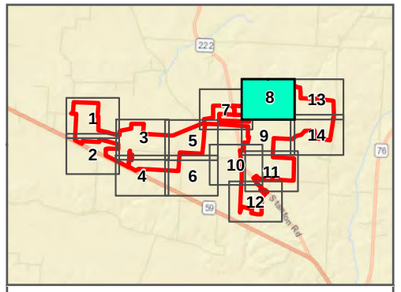

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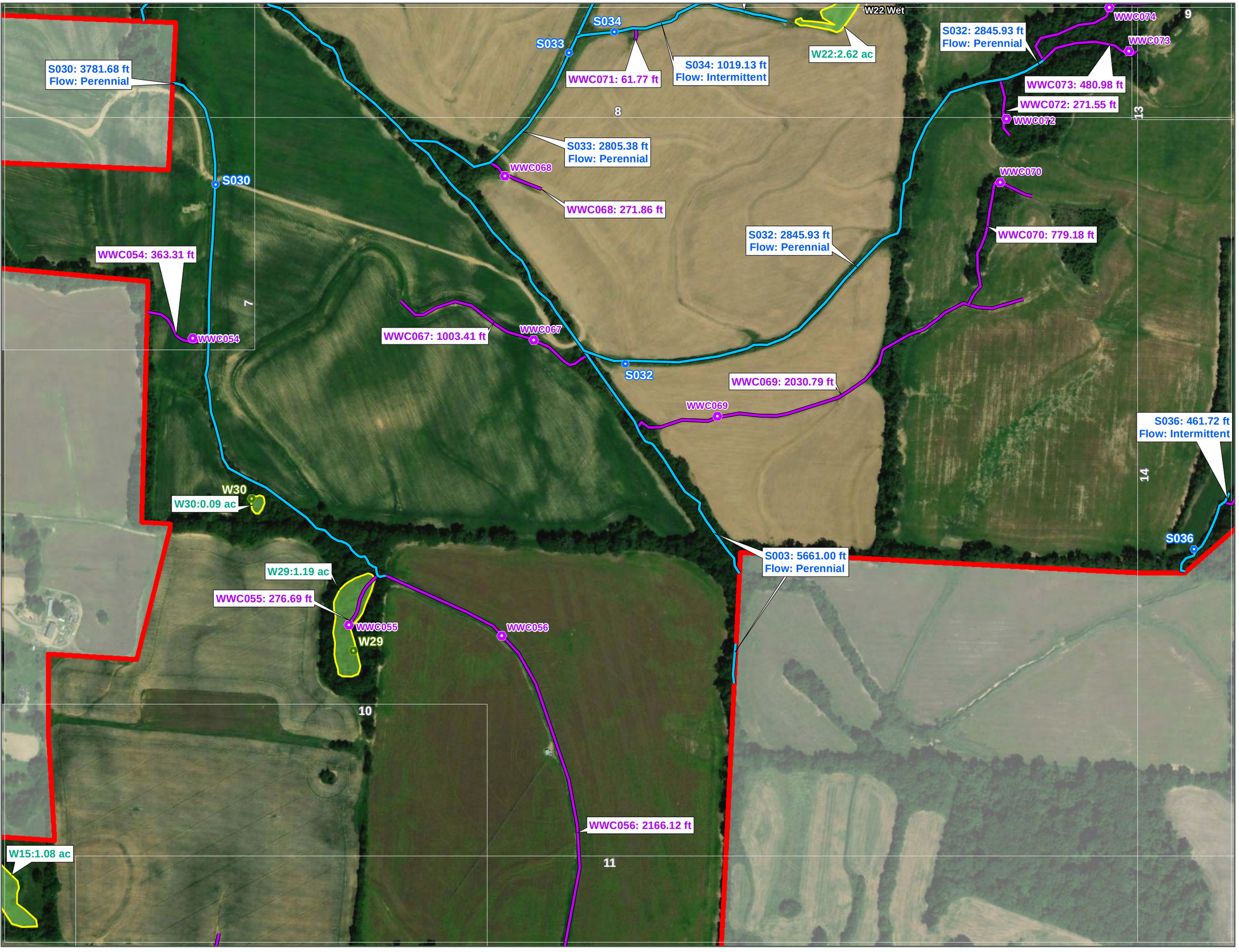

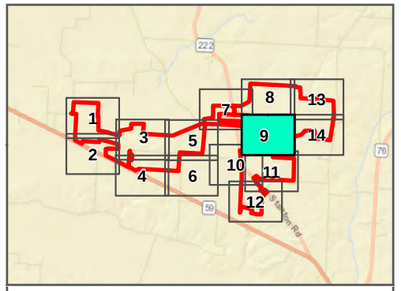

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FIGURE 7

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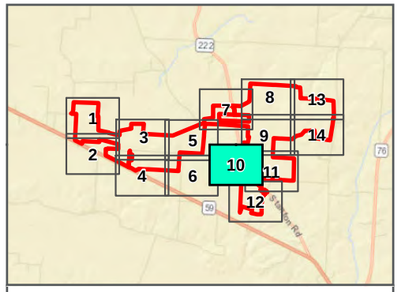

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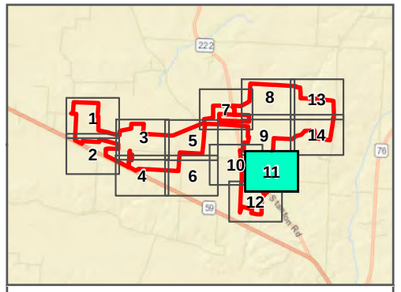

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YUM YUM SOLAR SITE
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FIGURE 7

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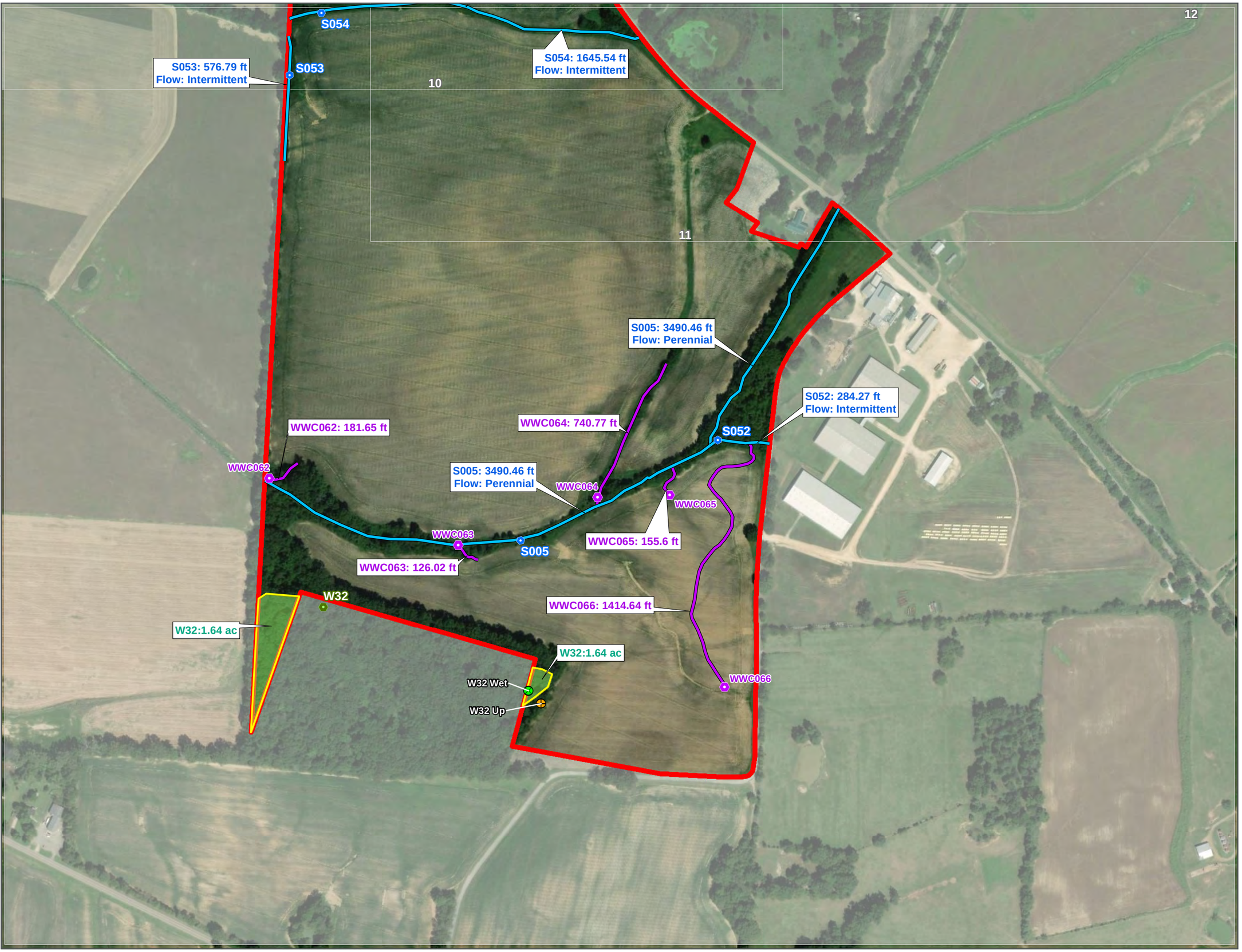

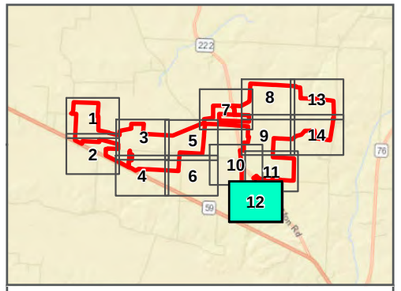

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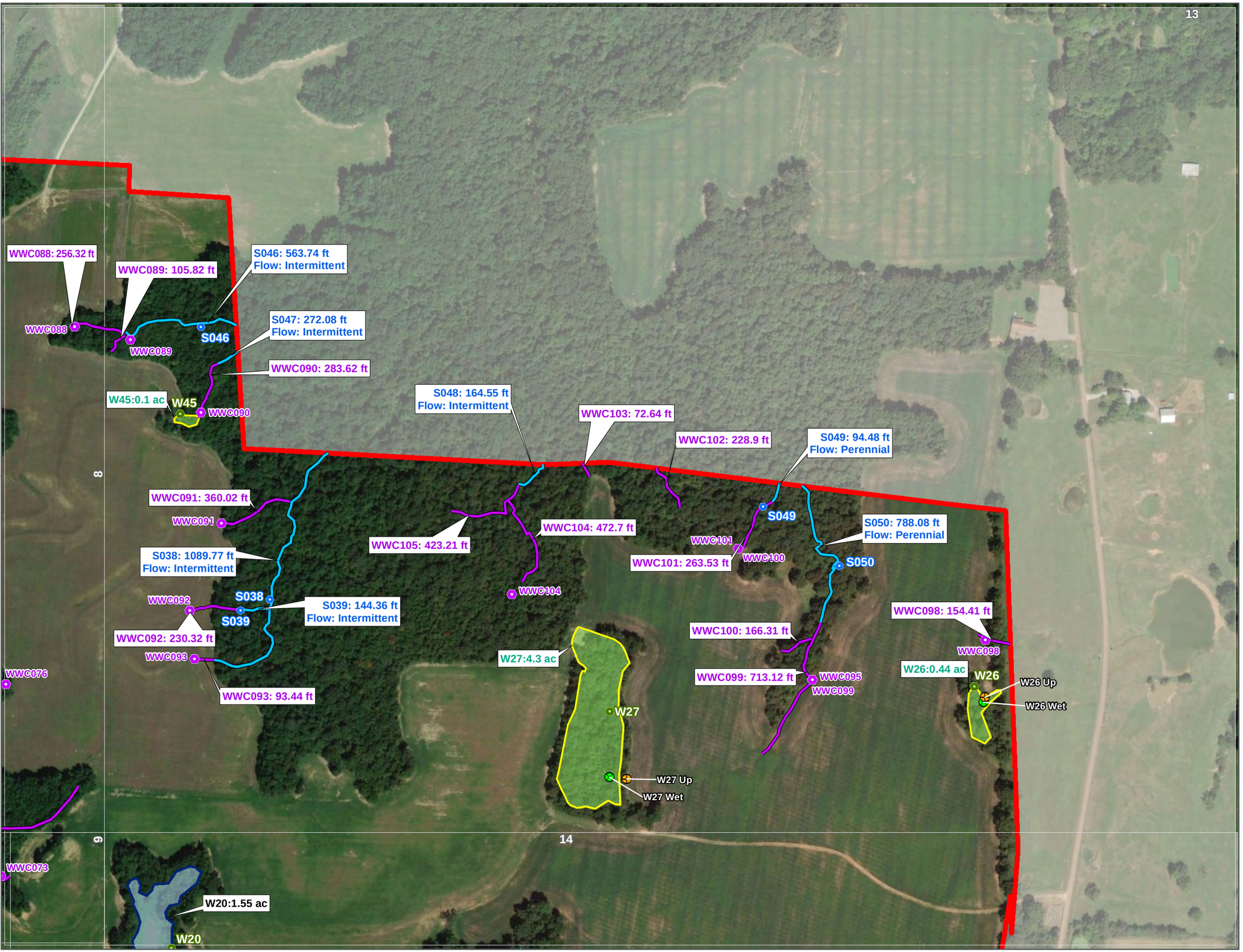
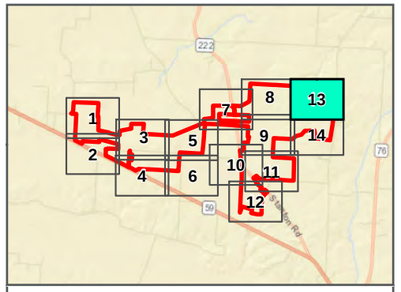
DELINEATED FEATURES
FIGURE 7
WETLAND DETERMINATION AND WETLAND/WATERBODY FIELD DELINEATION REPORT





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YUM YUM SOLAR SITE
DELINEATED FEATURES

FIGURE 7

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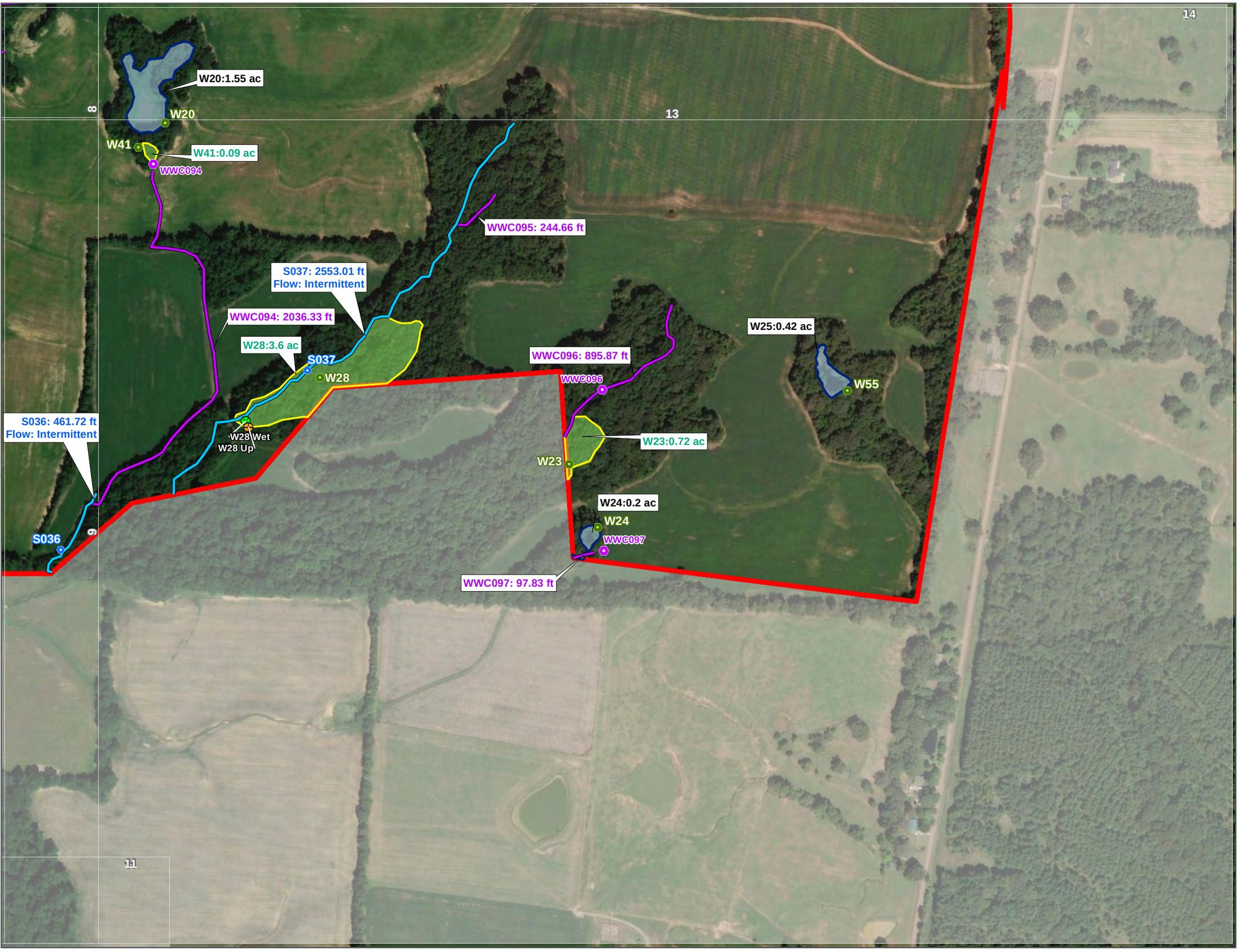

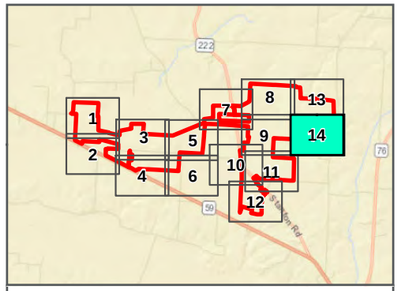

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YUM YUM SOLAR SITE
DELINEATED FEATURES
FIGURE 7

WETLAND DETERMINATION AND WETLAND/WATERBODY FIELD DELINEATION REPORT

Appendix B

Landowner Information

Table 1. Landowner information

Map ID*	Parcel Number	Owner Name	Address	City	State	Zip
1	035 03700 000035	Martha Fowler	681 W. Dr.	Memphis	TN	38112
2	044 02200 000044	Earnest McNabb	350 McNabb Rd.	Somerville	TN	38068
3	044 02400 000044	C.A. McNabb	8360 Hwy 59	Somerville	TN	38068
4	044 02700 000044	McNabb Dollahite Family Partners LP	8675 Highway 59	Somerville	TN	38068
5	044 02700 000044	McNabb Dollahite Family Partners LP	8676 Highway 59	Somerville	TN	38068
6	044 02500 000044	William W. Wilson	410 N West St	Somerville	TN	38068
7	045 02100 000045	William W. Wilson	411 N West St	Somerville	TN	38068
8	044 02600 000044	Fowler Properties LLC	681 W. Dr.	Memphis	TN	38112
9	034 01000 000034	Fowler Properties LLC	681 W. Dr.	Memphis	TN	38112
10	045 01700 000045	Winfrey W Whitson	2000 Highway 222	Somerville	TN	38068
11	045 01700 000045	Winfrey W Whitson	2000 Highway 222	Somerville	TN	38068
12	045 01700 000045	Winfrey W Whitson	2000 Highway 222	Somerville	TN	38068
13	044 02600 000044	Fowler Properties LLC	681 W. Dr.	Memphis	TN	38112
14	045 01700 000045	Winfrey W Whitson	2000 Highway 222	Somerville	TN	38068
15	045 01700 000045	Winfrey W Whitson	2000 Highway 222	Somerville	TN	38068
16	045 01700 000045	Winfrey W Whitson	2000 Highway 222	Somerville	TN	38068
17	045 01700 000045	Winfrey W Whitson	2000 Highway 222	Somerville	TN	38068
18	045 01400 000045	Charles Dacus	413 Oak St	Somerville	TN	38068
19	045 01700 000045	Winfrey W Whitson	2000 Highway 222	Somerville	TN	38068
20	034 01000 000034	Fowler Properties LLC	681 W. Dr.	Memphis	TN	38112
21	046 00100 000046	William Rutledge Garnett	4115 Yum Yum Rd	Somerville	TN	38068
22	046 00101 000046	W R Garnett Estate	4115 Yum Yum Rd	Somerville	TN	38068
23	046 01400 000033	William Rutledge Garnett	4115 Yum Yum Rd	Somerville	TN	38068
24	034 00800 000034	Meux Family Farms LLC	23 E Square Ln	Richmond	VA	23238
25	046 01300 000033	William Rutledge Garnett	4115 Yum Yum Rd	Somerville	TN	38068

Appendix C

Project Area Soils

Table 1. Project Area soil map units

Map Unit Symbol	Map Unit Name	Hydric Rating (%)
CaA	Calloway silt loam, 0 to 2 percent slopes	0
CaB	Calloway silt loam, 2 to 5 percent slopes	0
CaB2	Calloway silt loam, 2 to 5 percent slopes, eroded	0
CbA	Calloway silt loam, terrace, 0 to 2 percent slopes	0
CbB	Calloway silt loam, terrace, 2 to 5 percent slopes	0
CbB2	Calloway silt loam, terrace, 2 to 5 percent slopes, eroded	0
Co	Collins silt loam, 0 to 2 percent slopes, occasionally flooded, brief duration	0
Cu	Collins silt loam, local alluvium, 0 to 2 percent slopes, occasionally flooded, brief duration	0
Fm	Falaya silt loam	8
Fu	Falaya silt loam, local alluvium	0
GaA	Grenada silt loam, 0 to 2 percent slopes	0
GaB	Grenada silt loam, 2 to 5 percent slopes	0
GaB2	Grenada silt loam, 2 to 5 percent slopes, eroded	0
GaB3	Grenada silt loam, 2 to 5 percent slopes, severely eroded	0
GaC	Grenada silt loam, 5 to 8 percent slopes	0
GaC2	Grenada silt loam, 5 to 8 percent slopes, eroded	0
GaC3	Grenada silt loam, 5 to 8 percent slopes, severely eroded	0
GaD	Grenada silt loam, 8 to 12 percent slopes	0
GaD3	Grenada silt loam, 8 to 12 percent slopes, severely eroded	0
GbB	Grenada silt loam, terrace, 2 to 5 percent slopes	0
GbB2	Grenada silt loam, terrace, 2 to 5 percent slopes, eroded	0
GbB3	Grenada silt loam, terrace, 2 to 5 percent slopes, severely eroded	0
GbC3	Grenada silt loam, terrace, 5 to 8 percent slopes, severely eroded	0
GgC	Grenada-Gullied land complex, 5 to 8 percent slopes	0
GgD	Grenada-Gullied land complex, 8 to 12 percent slopes	0
Gs	Gullied land, silty	0
He	Henry silt loam	100
Ho	Henry silt loam, overwash	0
Ht	Henry silt loam, terrace	100

Map Unit Symbol	Map Unit Name	Hydric Rating (%)
LcC3	Lexington silty clay loam, 5 to 8 percent sloping severely eroded	0
LeD	Lexington-Ruston complex, 8 to 12 slopes (lexington-smithdale)	0
LeF3	Lexington-Ruston complex, 12 to 30 percent slopes, severely eroded (lexington-smithdale)	0
LfF	Lexington-Ruston-Gullied land complex, 12 to 30 percent slopes (lexington-smithdale-gullied land)	0
LgD	Loring-Gullied land complex, 5 to 12 percent slopes	0
LoB	Loring silt loam, 2 to 5 percent slopes	0
LoB3	Loring silt loam, 2 to 5 percent slopes, severely eroded	0
LoC3	Loring silt loam, 5 to 8 percent slopes, severely eroded	0
LoD3	Loring silt loam, 8 to 12 percent slopes, severely eroded	0
MeB	Memphis silt loam, 2 to 5 percent slopes	0
MeC	Memphis silt loam, 5 to 8 percent slopes, north	0
MfB3	Memphis silty clay loam, 2 to 5 percent slopes, severely eroded	0
MfC3	Memphis silty clay loam, 5 to 8 percent slopes, severely eroded	0
MfD3	Memphis silty clay loam, 8 to 12 percent slopes, severely eroded	0
MgD	Memphis-Gullied land complex, 5 to 12 percent slopes	0
W	Water	0
Wv	Waverly silt loam, 0 to 2 percent slopes, frequently flooded, long duration	100

Appendix D

Potentially Jurisdictional Waters

Table 1. Summary of on-site Potentially Jurisdictional Streams

Feature ID	Type of Aquatic Resource	Flow Type	USGS Identified Stream	Feature Length (ft.)	Latitude	Longitude	Figure 7 Page Number
S001 (Laurel Creek Canal)	Non-Section 10 – Non Wetland	Perennial	Yes	1107.08	-89.445706	35.325984	7-1
S002	Non-Section 10 – Non Wetland	Perennial	Yes	2423.96	-89.411821	35.328263	7-5
S003	Non-Section 10 – Non Wetland	Perennial	Yes	5661.00	-89.393011	35.333945	7-8
S004	Non-Section 10 – Non Wetland	Perennial	Yes	1362.58	-89.394686	35.315554	7-10
S005	Non-Section 10 – Non Wetland	Perennial	Yes	3490.46	-89.391264	35.308142	7-12
S006	Non-Section 10 – Non Wetland	Perennial	-	1722.14	-89.447134	35.325517	7-2
S007	Non-Section 10 – Non Wetland	Perennial	Yes	1122.17	-89.393156	35.341899	7-8
S008	Non-Section 10 – Non Wetland	Perennial	Yes	3430.87	-89.441032	35.323945	7-3
S009	Non-Section 10 – Non Wetland	Intermittent	-	384.65	-89.456608	35.335245	7-1
S010	Non-Section 10 – Non Wetland	Intermittent	-	1200.55	-89.452756	35.334523	7-1
S011	Non-Section 10 – Non Wetland	Perennial	-	556.66	-89.449103	35.333647	7-1
S012	Non-Section 10 – Non Wetland	Intermittent	-	2636.22	-89.451262	35.326943	7-1
S013	Non-Section 10 – Non Wetland	Intermittent	-	381.38	-89.448769	35.325567	7-2
S014	Non-Section 10 – Non Wetland	Intermittent	-	962.46	-89.444885	35.325260	7-2
S015	Non-Section 10 – Non Wetland	Intermittent	-	561.83	-89.444140	35.322158	7-2
S016	Non-Section 10 – Non Wetland	Intermittent	-	960.22	-89.438318	35.327930	7-3
S017	Non-Section 10 – Non Wetland	Intermittent	-	398.70	-89.439235	35.322686	7-3
S018	Non-Section 10 – Non Wetland	Intermittent	-	528.44	-89.412150	35.327582	7-3
S019	Non-Section 10 – Non Wetland	Intermittent	-	1468.27	-89.432475	35.328150	7-3

Feature ID	Type of Aquatic Resource	Flow Type	USGS Identified Stream	Feature Length (ft.)	Latitude	Longitude	Figure 7 Page Number
S020	Non-Section 10 – Non Wetland	Perennial	Yes	1167.51	-89.435938	35.321347	7-3
S021	Non-Section 10 – Non Wetland	Intermittent	-	288.22	-89.436643	35.322034	7-3
S022	Non-Section 10 – Non Wetland	Perennial	Yes	1970.52	-89.429632	35.319198	7-4
S023	Non-Section 10 – Non Wetland	Intermittent	-	1157.74	-89.424756	35.317979	7-4
S024	Non-Section 10 – Non Wetland	Intermittent	-	524.35	-89.424722	35.326414	7-3
S025	Non-Section 10 – Non Wetland	Intermittent	Yes	77.31	-89.421878	35.326903	7-5
S027	Non-Section 10 – Non Wetland	Intermittent	-	604.55	-89.419936	35.322513	7-5
S028	Non-Section 10 – Non Wetland	Intermittent	-	1212.03	-89.408582	35.330870	7-5
S029	Non-Section 10 – Non Wetland	Intermittent	-	324.28	-89.411304	35.330681	7-5
S030	Non-Section 10 – Non Wetland	Perennial	-	3781.68	-89.393956	35.330701	7-9
S032	Non-Section 10 – Non Wetland	Perennial	-	2845.93	-89.383962	35.330924	7-9
S033	Non-Section 10 – Non Wetland	Perennial	Yes	4457.52	-89.386626	35.336379	7-8
S034	Non-Section 10 – Non Wetland	Intermittent	-	1019.13	-89.386814	35.334076	7-8
S035	Non-Section 10 – Non Wetland	Intermittent	-	380.39	-89.380810	35.336768	7-8
S036	Non-Section 10 – Non Wetland	Intermittent	-	461.72	-89.378392	35.327654	7-9
S037	Non-Section 10 – Non Wetland	Intermittent	Yes	2553.01	-89.374003	35.330340	7-14
S038	Non-Section 10 – Non Wetland	Intermittent	Yes	1348.42	-89.375748	35.337712	7-13
S039	Non-Section 10 – Non Wetland	Intermittent	-	144.36	-89.376105	35.337254	7-13
S040	Non-Section 10 – Non Wetland	Intermittent	-	2802.88	-89.386833	35.341115	7-8

Feature ID	Type of Aquatic Resource	Flow Type	USGS Identified Stream	Feature Length (ft.)	Latitude	Longitude	Figure 7 Page Number
S041	Non-Section 10 – Non Wetland	Intermittent	-	1061.27	-89.386330	35.342013	7-8
S042	Non-Section 10 – Non Wetland	Intermittent	-	461.84	-89.387699	35.340934	7-8
S043	Non-Section 10 – Non Wetland	Intermittent	-	361.01	-89.384545	35.341869	7-8
S044	Non-Section 10 – Non Wetland	Intermittent	-	185.02	-89.383160	35.341671	7-8
S045	Non-Section 10 – Non Wetland	Intermittent	-	263.90	-89.380555	35.342491	7-8
S046	Non-Section 10 – Non Wetland	Intermittent	-	563.74	-89.377416	35.340883	7-13
S047	Non-Section 10 – Non Wetland	Intermittent	-	105.54	-89.376408	35.340555	7-13
S048	Non-Section 10 – Non Wetland	Intermittent	-	164.55	-89.371872	35.339060	7-13
S049	Non-Section 10 – Non Wetland	Perennial	-	94.48	-89.368100	35.338968	7-13
S050	Non-Section 10 – Non Wetland	Perennial	-	788.08	-89.367309	35.338200	7-13
S051	Non-Section 10 – Non Wetland	Intermittent	-	1475.10	-89.394531	35.337223	7-8
S052	Non-Section 10 – Non Wetland	Intermittent	Yes	284.27	-89.389435	35.308867	7-12
S053	Non-Section 10 – Non Wetland	Intermittent	-	576.79	-89.396578	35.313021	7-12
S054	Non-Section 10 – Non Wetland	Intermittent	-	1645.54	-89.393884	35.314258	7-10
S055	Non-Section 10 – Non Wetland	Intermittent	-	376.50	-89.387753	35.315557	7-11
S056	Non-Section 10 – Non Wetland	Intermittent	-	1167.03	-89.380488	35.314993	7-11
S057	Non-Section 10 – Non Wetland	Intermittent	-	123.77	-89.393071	35.341787	7-8
			Stream Total:	**67,179 lf**			

Table 2. Summary of on-site Potentially Jurisdictional Impounded Open Waters

Feature ID*	Cowardin Classification	Type of Aquatic Resource	Feature size within Project Area (Ac)	Latitude	Longitude	Figure 7 Page Number
W01	PUB	non section 10 – non wetland	0.42	35.325348	-89.435821	7-3
W03	PUB	non section 10 - wetland	0.39	35.315471	-89.386467	7-11
W08	PUB	non section 10 - wetland	0.36	35.326836	-89.415564	7-5
W10	PUB	non section 10 - wetland	0.83	35.318977	-89.433319	7-4
W11	PUB	non section 10 - wetland	1.93	35.320723	-89.433431	7-3
W12	PUB	non section 10 - wetland	1.13	35.319004	-89.431447	7-4
W14	PUB	non section 10 - wetland	1.22	35.318519	-89.428978	7-4
W16	PUB	non section 10 - wetland	0.82	35.316662	-89.395196	7-10
W20	PUB	non section 10 - wetland	1.55	35.333399	-89.377411	7-14
W21	PUB	non section 10 - wetland	0.63	35.330844	-89.397741	7-7
W24	PUB	non section 10 - wetland	0.20	35.327860	-89.370440	7-14
W25	PUB	non section 10 - wetland	0.42	35.330043	-89.366797	7-14
W33	PUB	non section 10 - wetland	0.38	35.320606	-89.438980	7-3
W36	PUB	non section 10 - wetland	0.74	35.325879	-89.437302	7-3
W40	PUB	non section 10 - wetland	0.30	35.321180	-89.423647	7-3
Impounded Open Waters Total:			**11.32 ac**			

Table 3. Summary of on-site Potentially Jurisdictional Wetlands

Feature ID*	Cowardin Classification	Type of Aquatic Resource	Feature size within Project Area (Ac)	Latitude	Longitude	Figure 7 Page Number	Data Form Sampling Point
W09	PEM	non section 10 - wetland	1.44	35.328341	-89.447987	7-1	W09
W15	PEM/FO	non section 10 - wetland	1.08	35.322710	-89.396886	7-10	W22
W17	PFO	non section 10 - wetland	0.75	35.323485	-89.413104	7-5	W19
W18	PEM	non section 10 - wetland	0.12	35.324578	-89.411224	7-5	W18
W19	PFO	non section 10 - wetland	10.28	35.323116	-89.416767	7-5	W19
W22	PEM	non section 10 - wetland	2.62	35.334969	-89.383707	7-8	W22
W23	PFO	non section 10 - wetland	0.76	35.329080	-89.370597	7-14	W28
W26	PFO	non section 10 - wetland	0.44	35.336255	-89.364865	7-13	W26
W27	PFO	non section 10 - wetland	4.30	35.335953	-89.370792	7-13	W27
W28	PFO	non section 10 - wetland	3.60	35.329845	-89.374378	7-14	W28
W29	PFO	non section 10 - wetland	1.19	35.326190	-89.391614	7-9	W28
W30	PFO	non section 10 - wetland	0.09	35.327653	-89.393103	7-9	W28
W31	PEM	non section 10 - wetland	0.10	35.319968	-89.386769	7-11	W22
W32	PFO	non section 10 - wetland	1.64	35.306078	-89.395898	7-12	W32
W34	PEM	non section 10 - wetland	0.23	35.321098	-89.439284	7-3	W34
W35	PEM	non section 10 - wetland	1.34	35.326101	-89.444246	7-1	W34
W37	PFO	non section 10 - wetland	3.60	35.328233	-89.438567	7-3	W37
W38	PFO	non section 10 - wetland	8.23	35.325095	-89.450603	7-2	W38
W39	PFO	non section 10 - wetland	0.05	35.321168	-89.442351	7-2	W37

Feature ID*	Cowardin Classification	Type of Aquatic Resource	Feature size within Project Area (Ac)	Latitude	Longitude	Figure 7 Page Number	Data Form Sampling Point
W41	PFO	non section 10 - wetland	0.09	35.332569	-89.377417	7-14	W38
W42	PFO	non section 10 - wetland	0.30	35.342487	-89.387983	7-8	W38
W43	PFO	non section 10 - wetland	1.36	35.340949	-89.394330	7-8	W38
W44	PFO	non section 10 - wetland	0.10	35.342095	-89.386048	7-8	W38
W45	PEM	non section 10 - wetland	0.10	35.339627	-89.377240	7-13	W22
		Wetland Total:	**43.81 ac.**				

Appendix E

Non-Jurisdictional Wet Weather Conveyances

Table 1. Non-jurisdictional Wwet Weather Conveyances

Feature ID	Feature Type	Feature Length (ft.)	Start		End		Figure Number
			Longitude	Latitude	Longitude	Latitude	
WWC001	WWC	396.638	-89.45657906	35.33242441	-89.45762184	35.33240488	7-1
WWC002	WWC	683.687	-89.45537885	35.33323488	-89.4563116	35.33477677	7-1
WWC003	WWC	208.711	-89.44979537	35.33525367	-89.45001845	35.33576857	7-1
WWC004	WWC	756.624	-89.44922638	35.33467574	-89.44900537	35.33509547	7-1
WWC005	WWC	452.600	-89.45128891	35.33034364	-89.45131869	35.33098587	7-1
WWC006	WWC	716.046	-89.45117036	35.33075069	-89.45012469	35.32987084	7-1
WWC007	WWC	925.226	-89.4533306	35.32976411	-89.45330014	35.33169052	7-1
WWC008	WWC	106.405	-89.4533306	35.32976411	-89.45526793	35.33050945	7-1
WWC009	WWC	1380.034	-89.4567286	35.32967535	-89.45682811	35.32940472	7-1
WWC010	WWC	366.687	-89.45436446	35.32465375	-89.45536043	35.32826871	7-2
WWC011	WWC	497.975	-89.45471705	35.32510189	-89.45577648	35.32558885	7-1
WWC012	WWC	196.935	-89.45250376	35.32656908	-89.45128426	35.32697538	7-1
WWC013	WWC	436.329	-89.44979683	35.32608839	-89.44999935	35.32564288	7-1
WWC014	WWC	304.970	-89.44929413	35.32667249	-89.44922462	35.32564047	7-3
WWC015	WWC	31.065	-89.440681	35.32784139	-89.4402131	35.32713049	7-1
WWC016	WWC	405.053	-89.44263358	35.3266908	-89.44264168	35.32677589	7-3
WWC017	WWC	204.913	-89.43910666	35.327781	-89.43862545	35.32676283	7-3
WWC018	WWC	1092.307	-89.43682021	35.32839883	-89.43658363	35.32892471	7-3
WWC019	WWC	951.592	-89.4368143	35.32840072	-89.43341015	35.32950656	7-3
WWC020	WWC	104.673	-89.43467999	35.32515045	-89.4325419	35.32644298	7-3
WWC021	WWC	1288.895	-89.4319522	35.32590107	-89.43166474	35.32581861	7-3
WWC022	WWC	289.142	-89.43204948	35.32600747	-89.42872944	35.32457367	7-3
WWC023	WWC	46.515	-89.43009715	35.32532293	-89.43010001	35.32465933	7-3
WWC024	WWC	47.584	-89.43044931	35.32702472	-89.43052199	35.32713778	7-3
WWC025	WWC	686.678	-89.43028751	35.32703424	-89.43038862	35.32713535	7-3
WWC026	WWC	1732.485	-89.42698072	35.3270732	-89.4278043	35.32540743	7-3
WWC027	WWC	1113.502	-89.42756445	35.32318026	-89.42679506	35.32706981	7-3
WWC028	WWC	863.594	-89.42393114	35.32628283	-89.42514882	35.32478497	7-2

Feature ID	Feature Type	Feature Length (ft.)	Start		End		Figure Number
			Longitude	Latitude	Longitude	Latitude	
WWC029	WWC	524.945	-89.44323725	35.32203532	-89.44203591	35.3199436	7-4
WWC030	WWC	84.163	-89.43882444	35.31844416	-89.43882444	35.31844416	7-3
WWC031	WWC	467.572	-89.43924713	35.32183099	-89.43931566	35.32205371	7-3
WWC032	WWC	54.743	-89.43166474	35.32323546	-89.43124532	35.32233967	7-3
WWC033	WWC	65.778	-89.43674765	35.32241492	-89.43677306	35.32256386	7-3
WWC034	WWC	78.040	-89.4358566	35.32240616	-89.43587353	35.32258634	7-3
WWC035	WWC	875.851	-89.43484846	35.32251327	-89.43506935	35.32239841	7-3
WWC036	WWC	191.194	-89.43125728	35.32232472	-89.43125728	35.32232472	7-3
WWC037	WWC	525.289	-89.43350464	35.31966072	-89.43358009	35.32018068	7-4
WWC039	WWC	1067.633	-89.42920483	35.31675397	-89.4292856	35.31812513	7-4
WWC040	WWC	278.664	-89.4237809	35.32099801	-89.42604191	35.31872477	7-4
WWC041	WWC	233.329	-89.42537979	35.31848738	-89.42418233	35.31958842	7-4
WWC042	WWC	1028.164	-89.42434365	35.31913547	-89.42375133	35.31880207	7-5
WWC043	WWC	90.578	-89.41991769	35.3207647	-89.42041704	35.31940245	7-5
WWC044	WWC	222.052	-89.42057836	35.3233061	-89.42041333	35.32351173	7-5
WWC045	WWC	922.078	-89.42056693	35.3238573	-89.4203108	35.32328451	7-5
WWC046	WWC	75.182	-89.42089244	35.32441493	-89.4218891	35.32679832	7-5
WWC047	WWC	174.871	-89.4230054	35.32682295	-89.42289344	35.32699853	7-5
WWC048	WWC	130.351	-89.41913962	35.32800748	-89.41930734	35.32755207	7-5
WWC049	WWC	1508.130	-89.41708721	35.32873297	-89.41731468	35.32847313	7-5
WWC050	WWC	774.238	-89.41794767	35.32844615	-89.41326381	35.32997387	7-5
WWC051	WWC	95.788	-89.41248415	35.32690984	-89.41358812	35.32503297	7-7
WWC052	WWC	503.739	-89.41049496	35.33197678	-89.41081544	35.33199357	7-7
WWC053	WWC	921.112	-89.40665732	35.33468384	-89.407572	35.33622318	7-7
WWC054	WWC	363.306	-89.40241064	35.33494941	-89.40076711	35.33634388	7-9
WWC055	WWC	276.694	-89.39489939	35.33003875	-89.3939508	35.32981721	7-9
WWC056	WWC	2166.123	-89.3916317	35.32613475	-89.39120835	35.3267937	7-9
WWC057	WWC	739.753	-89.38695761	35.31990901	-89.39108315	35.32679729	7-11

Feature ID	Feature Type	Feature Length (ft.)	Start		End		Figure Number
			Longitude	Latitude	Longitude	Latitude	
WWC058	WWC	1662.044	-89.39056583	35.32200151	-89.38813021	35.32207908	7-10
WWC059	WWC	1523.805	-89.39347384	35.3221848	-89.39651	35.318684	7-11
WWC060	WWC	918.995	-89.39104094	35.32086978	-89.3942085	35.32025302	7-11
WWC061	WWC	172.977	-89.39277936	35.31658298	-89.38954742	35.31982478	7-11
WWC062	WWC	181.654	-89.38806985	35.31646222	-89.38802837	35.31602145	7-12
WWC063	WWC	126.024	-89.39672862	35.30817492	-89.39623275	35.30840908	7-12
WWC064	WWC	740.773	-89.39339544	35.30726888	-89.39371953	35.30745128	7-12
WWC065	WWC	155.596	-89.39059631	35.30983232	-89.39159881	35.30799331	7-12
WWC066	WWC	1414.637	-89.39045597	35.30853476	-89.39049185	35.30818191	7-12
WWC067	WWC	1003.410	-89.38927934	35.30886506	-89.38950701	35.30574064	7-9
WWC068	WWC	271.862	-89.38807896	35.32967715	-89.3910006	35.3302934	7-9
WWC069	WWC	2030.791	-89.38887902	35.33176937	-89.38969159	35.33208274	7-9
WWC070	WWC	779.184	-89.38723725	35.32873053	-89.38136163	35.3305855	7-9
WWC071	WWC	61.774	-89.38221189	35.33049236	-89.38128283	35.33189536	7-8
WWC072	WWC	271.551	-89.38749756	35.33384998	-89.38751128	35.3336904	7-9
WWC073	WWC	480.984	-89.3816618	35.33265408	-89.38183886	35.33336038	7-8
WWC074	WWC	1016.873	-89.38118348	35.3336246	-89.37973403	35.3337826	7-8
WWC075	WWC	403.715	-89.37872137	35.33495265	-89.38118348	35.3336246	7-8
WWC076	WWC	365.672	-89.38036551	35.33589047	-89.38058968	35.33697177	7-8
WWC077	WWC	89.482	-89.37988968	35.33620819	-89.38058968	35.33697177	7-8
WWC078	WWC	1637.738	-89.39370849	35.33775424	-89.39341371	35.33771756	7-8
WWC079	WWC	278.532	-89.38071361	35.33886222	-89.38551659	35.33766007	7-8
WWC080	WWC	110.749	-89.39392991	35.34028007	-89.39472449	35.34051663	7-8
WWC081	WWC	340.173	-89.39386894	35.34069701	-89.39420983	35.34078325	7-8
WWC082	WWC	136.499	-89.39200051	35.3413042	-89.39290266	35.34168804	7-8
WWC083	WWC	65.323	-89.39241087	35.34150444	-89.39198325	35.34139202	7-8
WWC084	WWC	333.231	-89.39241087	35.34150444	-89.39226069	35.3416304	7-8
WWC085	WWC	92.078	-89.39004289	35.34244612	-89.38900471	35.34220653	7-8

Feature ID	Feature Type	Feature Length (ft.)	Start		End		Figure Number
			Longitude	Latitude	Longitude	Latitude	
WWC086	WWC	248.651	-89.38843821	35.3420675	-89.38867929	35.3419145	7-8
WWC087	WWC	188.213	-89.38756733	35.34010089	-89.3880082	35.34045575	7-8
WWC088	WWC	256.318	-89.38619582	35.34210368	-89.38641366	35.34257236	7-13
WWC089	WWC	105.824	-89.37906873	35.34076683	-89.37825368	35.3406722	7-13
WWC090	WWC	283.622	-89.37845005	35.34045981	-89.37824797	35.34066564	7-13
WWC091	WWC	360.020	-89.37705768	35.33965822	-89.37679272	35.3403566	7-13
WWC092	WWC	230.325	-89.37665698	35.33834407	-89.37558417	35.33863821	7-13
WWC093	WWC	93.441	-89.37709298	35.33720126	-89.37634514	35.33724926	7-13
WWC094	WWC	2036.328	-89.3770062	35.33661014	-89.37669302	35.33660706	7-14
WWC095	WWC	244.663	-89.37815043	35.32809282	-89.37737183	35.33232206	7-14
WWC096	WWC	895.868	-89.37205706	35.332185	-89.37265098	35.33178144	7-14
WWC097	WWC	97.833	-89.36927024	35.33085948	-89.37086104	35.32913537	7-14
WWC098	WWC	154.411	-89.37034535	35.32768487	-89.37066029	35.3276107	7-13
WWC099	WWC	713.122	-89.36442508	35.33715513	-89.3649246	35.33725709	7-13
WWC100	WWC	166.310	-89.36736135	35.33734285	-89.36819387	35.33565805	7-13
WWC101	WWC	263.531	-89.36794238	35.33696957	-89.36745582	35.33714522	7-13
WWC102	WWC	228.896	-89.36816561	35.33885142	-89.36858916	35.33826132	7-13
WWC103	WWC	72.644	-89.36958924	35.3387361	-89.36997456	35.33923168	7-13
WWC104	WWC	472.700	-89.37099979	35.33909016	-89.37112684	35.33926004	7-13
WWC105	WWC	423.210	-89.3719906	35.33772435	-89.37225043	35.33875584	7-13
WWC Total:		**55,180 lf**					

Appendix F

Hydrologic Determination Field Data Sheets

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.4 WWC Form 1

County: Fayette	Named Waterbody: unnamed ~~WWC 001~~	Date/Time: 2018 11/13
Assessors/Affiliation: M. Swenson HDR		Project ID : WWC 001
Site Name/Description: Yum Yum Solar		
Site Location: Yum Yum, TN		
USGS quad: 03508655	HUC (12 digit): 08010209	Lat/Long: 35.3236, -89.42044
Previous Rainfall (7-days) : 0.52"		
Precipitation this Season vs. Normal : very wet wet (average) dry drought unknown Source of recent & seasonal precip data : NOAA & NRCS		
Watershed Size :	Photos: (Y) or N (circle) Number : See photo log	
Soil Type(s) / Geology : GaC3		Source: NRCS
Surrounding Land Use : Agriculture - cotton		
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe (Moderate) Slight Absent		

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	✓	WWC
2. Defined bed and bank absent, dominated by upland vegetation / grass	✓	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	N/A	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	N/A	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	N/A	Stream
6. Presence of fish (except *Gambusia*)	✓	Stream
7. Presence of naturally occurring ground water table connection	✓	Stream
8. Flowing water in channel and 7 days since last precipitation in local watershed	N/A	Stream
9. Evidence watercourse has been used as a supply of drinking water	✓	Stream

NOTE : If any Primary Indicators 1-9 = "Yes", then STOP; absent directly contradictory evidence, determination is complete.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.4*

Overall Hydrologic Determination = Wet weather conveyance

Secondary Indicator Score (if applicable) = 11.5

Justification / Notes : channel is altered by agricultural activities along the landscape
hydrology is altered due to terraces directing flows along the landscape.

This data form is representative of WWC044 and WWC043

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 5)	Absent	Weak	Moderate	Strong
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal = 2.5)	Absent	Weak	Moderate	Strong
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in stream bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal = 4)	Absent	Weak	Moderate	Strong
20. Fibrous roots in channel [1]	3	2	1	0
21. Rooted plants in channel [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	0.5	1	1.5
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28. Wetland plants in channel [2]	0	0.5	1	2

[1] Focus is on the presence of upland plants. [2] Focus is on the presence of aquatic or wetland plants.

Total Points = 11.5

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes : - Erosional feature located @ agricultural field edge
- ~~Appears~~ severly incised due to adjacent landuse
- No Biologic indicators observed

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.4 WWC Form 002

County: Fayette	Named Waterbody: unnamed	Date/Time: 2018 11/13
Assessors/Affiliation: M. Swanson HDR		Project ID : WWC002
Site Name/Description: Yum Yum Solar		
Site Location: Yum Yum, TN		
USGS quad: 03508665	HUC (12 digit): 08010209	Lat/Long: 35.3256, -89.421360
Previous Rainfall (7-days) : 0.52 inches		
Precipitation this Season vs. Normal : very wet wet ~~average~~ dry drought unknown Source of recent & seasonal precip data : NOAA/NRCS		
Watershed Size :	Photos: (Y) or N (circle) Number : See photo log	
Soil Type(s) / Geology : GtB2		Source: NRCS
Surrounding Land Use : Agricultural - Cotton		
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : (Severe) Moderate Slight Absent		

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	X	WWC
2. Defined bed and bank absent, dominated by upland vegetation / grass	X	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	N/A	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	X	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	X	Stream
6. Presence of fish (except *Gambusia*)	X	Stream
7. Presence of naturally occurring ground water table connection	X	Stream
8. Flowing water in channel and 7 days since last precipitation in local watershed	N/A	Stream
9. Evidence watercourse has been used as a supply of drinking water	X	Stream

NOTE : If any Primary Indicators 1-9 = "Yes", then STOP; absent directly contradictory evidence, determination is complete.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.4*

Overall Hydrologic Determination = Wet Weather Conveyance

Secondary Indicator Score (if applicable) = 11.5

Justification / Notes : Hydrology and channel morphology are altered by adjacent agricultural practices

This data form is representative of WWC045, and WWC047.

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 6)	Absent	Weak	Moderate	Strong
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal = 2)	Absent	Weak	Moderate	Strong
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in stream bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal = 3.5)	Absent	Weak	Moderate	Strong
20. Fibrous roots in channel [1]	3	2	1	0
21. Rooted plants in channel [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	0.5	1	1.5
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel [2]	0	0.5	1	2

[1] Focus is on the presence of upland plants. [2] Focus is on the presence of aquatic or wetland plants.

Total Points = 11.5

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes : – Erosional feature w/in agricultural field

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.4 WWC Form 003

County: Fayette	Named Waterbody: unnamed	Date/Time: 2018 11/13
Assessors/Affiliation: M. Swenson HDR		Project ID : WWC 003
Site Name/Description: Yum Yum Solar		
Site Location: Yum Yum, TN		
USGS quad: 03508bb5	HUC (12 digit): 08010209	Lat/Long: 35.3269, -89.42296
Previous Rainfall (7-days) : 0.52"		
Precipitation this Season vs. Normal : very wet wet (average) dry drought unknown Source of recent & seasonal precip data : NOAA/NRCS		
Watershed Size :	Photos: (Y) or N (circle) Number : See photo log	
Soil Type(s) / Geology : GaC3		Source: NRCS
Surrounding Land Use : Agriculture - cotton		
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : (Severe) Moderate Slight Absent		

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	X	WWC
2. Defined bed and bank absent, dominated by upland vegetation / grass	X	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	N/A	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	X	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	X	Stream
6. Presence of fish (except *Gambusia*)	X	Stream
7. Presence of naturally occurring ground water table connection	X	Stream
8. Flowing water in channel and 7 days since last precipitation in local watershed	X	Stream
9. Evidence watercourse has been used as a supply of drinking water	X	Stream

NOTE : If any Primary Indicators 1-9 = "Yes", then STOP; absent directly contradictory evidence, determination is complete.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.4*

Overall Hydrologic Determination = wet weather conveyance

Secondary Indicator Score (if applicable) = 7

Justification / Notes : - Morphology and hydrology are influenced by adjacent agricultural activities.
- Conveyance begins behind critical terrace w/in agricultural field.

This data form is representative of WWC046

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 3)	Absent	Weak	Moderate	Strong
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal = 2)	Absent	Weak	Moderate	Strong
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain N/A	0	1	2	3
16. Leaf litter in channel (January – September) N/A	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in stream bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal = 2)	Absent	Weak	Moderate	Strong
20. Fibrous roots in channel [1]	3	2	1	0
21. Rooted plants in channel [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	0.5	1	1.5
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28. Wetland plants in channel [2]	0	0.5	1	2

[1] Focus is on the presence of upland plants. [2] Focus is on the presence of aquatic or wetland plants.

Total Points = 7

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes : -erosional feature that originates along a man made terrace w/in agricultural field.

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.4 WWC Form 004

County: Fayette	Named Waterbody: unnamed	Date/Time: 2018 11/13
Assessors/Affiliation: M. Swenson HDR		Project ID : WWC 004
Site Name/Description: Yum Yum Solar		
Site Location: Yum Yum, TN		
USGS quad: 03508655	HUC (12 digit): 08010209	Lat/Long: 35.32573, -89.42396
Previous Rainfall (7-days) : 0.88"		
Precipitation this Season vs. Normal : very wet wet (average) dry drought unknown Source of recent & seasonal precip data : NOAA/NRCS		
Watershed Size :	Photos: (Y) or N (circle) Number : See photo log	
Soil Type(s) / Geology : LgD		Source: NRCS
Surrounding Land Use : Agriculture - Cotton		
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : (Severe) Moderate Slight Absent		

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	X	WWC
2. Defined bed and bank absent, dominated by upland vegetation / grass	X	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	N/A	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	X	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	X	Stream
6. Presence of fish (except *Gambusia*)	X	Stream
7. Presence of naturally occurring ground water table connection	X	Stream
8. Flowing water in channel and 7 days since last precipitation in local watershed	X	Stream
9. Evidence watercourse has been used as a supply of drinking water	X	Stream

NOTE : If any Primary Indicators 1-9 = "Yes", then STOP; absent directly contradictory evidence, determination is complete.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.4*

Overall Hydrologic Determination = Wet Weather Conveyance

Secondary Indicator Score (if applicable) = 16.5

Justification / Notes : - Site is impacted by agricultural activities - feature is drainage from a man made terrace w/in an agricultural field

This data form is representative of WWC027

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 3)	Absent	Weak	Moderate	Strong
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal = 1.5)	Absent	Weak	Moderate	Strong
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September) N/A	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in stream bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal = 6)	Absent	Weak	Moderate	Strong
20. Fibrous roots in channel [1]	3	2	1	0
21. Rooted plants in channel [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	0.5	1	1.5
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28. Wetland plants in channel [2]	0	0.5	1	2

[1] Focus is on the presence of upland plants. [2] Focus is on the presence of aquatic or wetland plants.

Total Points = 10.5

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes : - ~~the~~ feature is an erosional feature behind a terrace w/in an agricultural field.

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.4 WWC Form 005

County: Fayette	Named Waterbody: NA	Date/Time: 2018 11/13
Assessors/Affiliation: M. Swenson HDR		Project ID : WWC 005
Site Name/Description: Yum Yum Solar		
Site Location: Yum Yum TN		
USGS quad: 03508665	HUC (12 digit): 08010209	Lat/Long: 35.3254, -89.426724
Previous Rainfall (7-days) :		
Precipitation this Season vs. Normal : very wet wet average dry drought unknown Source of recent & seasonal precip data :		
Watershed Size :	Photos: Y or N (circle) Number : See photo log	
Soil Type(s) / Geology : GaC3		Source: NRCS
Surrounding Land Use : Agriculture - cotton		
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe Moderate Slight Absent		

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	X	WWC
2. Defined bed and bank absent, dominated by upland vegetation / grass	X	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	N/A	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	X	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	X	Stream
6. Presence of fish (except *Gambusia*)	X	Stream
7. Presence of naturally occurring ground water table connection	X	Stream
8. Flowing water in channel and 7 days since last precipitation in local watershed	X	Stream
9. Evidence watercourse has been used as a supply of drinking water	X	Stream

NOTE : If any Primary Indicators 1-9 = "Yes", then STOP; absent directly contradictory evidence, determination is complete.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.4*

Overall Hydrologic Determination =

Secondary Indicator Score (if applicable) =

Justification / Notes : - feature is located w/in a forested drainage along an agricultural field. Morphology and hydrology are altered by adjacent agricultural activities.

This data form is representative of WWC025 and WWC026.

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 3)	Absent	Weak	Moderate	Strong
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal = 1.5)	Absent	Weak	Moderate	Strong
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September) N/A	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in stream bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal = 4)	Absent	Weak	Moderate	Strong
20. Fibrous roots in channel [1]	3	2	1	0
21. Rooted plants in channel [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	0.5	1	1.5
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28. Wetland plants in channel [2]	0	0.5	1	2

[1] Focus is on the presence of upland plants. [2] Focus is on the presence of aquatic or wetland plants.

Total Points = 8.5

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :
- feature originates along a terrace w/in an agricultural field.
- Erosional feature from flow directed off adjacent agricultural field

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.4 WWC Form 006

County: Fayette	Named Waterbody: NA	Date/Time: 2018 11/13
Assessors/Affiliation: Mitchenson HDR		Project ID : WWC 006
Site Name/Description: Yum Yum Solar		
Site Location: Yum Yum, TN		
USGS quad: 03508665	HUC (12 digit): 08010209	Lat/Long: 35.32544, -89.43313
Previous Rainfall (7-days) : 0.52"		
Precipitation this Season vs. Normal : very wet wet (average) dry drought unknown Source of recent & seasonal precip data : NOAA/NRCS		
Watershed Size :	Photos: (Y) or N (circle) Number : See photo log	
Soil Type(s) / Geology : Grg D		Source: NRCS
Surrounding Land Use : Agriculture - Cotton		
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : (Severe) Moderate Slight Absent		

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	X	WWC
2. Defined bed and bank absent, dominated by upland vegetation / grass	X	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	N/A	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	X	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	X	Stream
6. Presence of fish (except *Gambusia*)	X	Stream
7. Presence of naturally occurring ground water table connection	X	Stream
8. Flowing water in channel and 7 days since last precipitation in local watershed	X	Stream
9. Evidence watercourse has been used as a supply of drinking water	X	Stream

NOTE : If any Primary Indicators 1-9 = "Yes", then STOP; absent directly contradictory evidence, determination is complete.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.4*

Overall Hydrologic Determination =

Secondary Indicator Score (if applicable) =

Justification / Notes : - Site is a drainage feature originating @ a terrace w/in adjacent agricultural field.
- Morphology / hydrology are influenced/impacted by agricultural activities.

This data form is representative of WWC019.

Secondary Field Indicator Evaluation

A. **Geomorphology** (Subtotal = 3)	Absent	Weak	Moderate	Strong
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. **Hydrology** (Subtotal = 2)	Absent	Weak	Moderate	Strong
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September) N/A	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in stream bed or sides of channel	No = 0		Yes = 1.5	

C. **Biology** (Subtotal = 5)	Absent	Weak	Moderate	Strong
20. Fibrous roots in channel [1]	3	2	1	0
21. Rooted plants in channel [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	0.5	1	1.5
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel [2]	0	0.5	1	2

[1] Focus is on the presence of upland plants. [2] Focus is on the presence of aquatic or wetland plants.

Total Points = 10

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes : - Erosional feature w/in a wooded field drainage
- feature begins @ a headcut w/in an agricultural field.

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.4 WWC Form 007

County: Fayette	Named Waterbody: NA	Date/Time: 2018 11/13
Assessors/Affiliation: M. Swenson		Project ID: WWC 007
Site Name/Description: Yum Yum Solar		
Site Location: Yum Yum, TN		
USGS quad: 03508665	HUC (12 digit): 08010209	Lat/Long: 35.37569, -89.43164
Previous Rainfall (7-days): 0.52		
Precipitation this Season vs. Normal: very wet wet average dry drought unknown Source of recent & seasonal precip data: NOAA/NRCS		
Watershed Size:	Photos: Y or N (circle) Number: See photo log	
Soil Type(s) / Geology: Fu		Source: NRCS
Surrounding Land Use: Agricultural - cotton		
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes): Severe Moderate Slight Absent		

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	X	WWC
2. Defined bed and bank absent, dominated by upland vegetation / grass	X	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	N/A	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	X	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	X	Stream
6. Presence of fish (except *Gambusia*)	X	Stream
7. Presence of naturally occurring ground water table connection	X	Stream
8. Flowing water in channel and 7 days since last precipitation in local watershed	X	Stream
9. Evidence watercourse has been used as a supply of drinking water	X	Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then STOP; absent directly contradictory evidence, determination is complete.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.4*

Overall Hydrologic Determination =

Secondary Indicator Score (if applicable) =

Justification / Notes:
- feature is located w/in a forested drainage
- Morphology and hydrology are altered by adjacent agricultural practices.
- Multiple terraced drainages feed into this system

This data form is representative for WWC020, WWC021, WWC023, and WWC024.

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 3)	Absent	Weak	Moderate	Strong
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal = 1.5)	Absent	Weak	Moderate	Strong
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September) N/A	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in stream bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal = 3)	Absent	Weak	Moderate	Strong
20. Fibrous roots in channel [1]	3	2	1	0
21. Rooted plants in channel [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	0.5	1	1.5
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28. Wetland plants in channel [2]	0	0.5	1	2

[1] Focus is on the presence of upland plants. [2] Focus is on the presence of aquatic or wetland plants.

Total Points = 7.5

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :
- wetland vegetation w/in channel - persicaria sp.
- flow is derived from drainages off adjacent agricultural fields.

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.4 WWC Form 008

County: Fayette	Named Waterbody: NA	Date/Time: 2018 11/13
Assessors/Affiliation: M. Swenson		Project ID : WWC 008
Site Name/Description: Yum Yum Solar		
Site Location: Yum Yum, TN		
USGS quad: 035086b5	HUC (12 digit): 08010209	Lat/Long: 35.325314, -89.43008
Previous Rainfall (7-days) : 0.52"		
Precipitation this Season vs. Normal : very wet wet (average) dry drought unknown Source of recent & seasonal precip data : NOAA / NRCS		
Watershed Size :	Photos: (Y) or N (circle) Number : See photo log	
Soil Type(s) / Geology : Ga C3		Source: NRCS
Surrounding Land Use : agriculture - cotton		
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : (Severe) Moderate Slight Absent		

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	X	WWC
2. Defined bed and bank absent, dominated by upland vegetation / grass		(WWC)
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	X	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	X	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	X	Stream
6. Presence of fish (except *Gambusia*)	X	Stream
7. Presence of naturally occurring ground water table connection	X	Stream
8. Flowing water in channel and 7 days since last precipitation in local watershed	X	Stream
9. Evidence watercourse has been used as a supply of drinking water	X	Stream

NOTE : If any Primary Indicators 1-9 = "Yes", then STOP; absent directly contradictory evidence, determination is complete.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.4*

Overall Hydrologic Determination = wet weather conveyance

Secondary Indicator Score (if applicable) = N/A

Justification / Notes : - feature is a grass swale located behind a man made terrace w/ no defined bed/Bank
- Dominante veg is Nutsedge (Cyperus esculentus) (FAC) and johnson grass (Sorghum halepense) (FACU)

This data form is representative for WWC022.

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in stream bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal =)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel [1]	3	2	1	0
21. Rooted plants in channel [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	0.5	1	1.5
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel [2]	0	0.5	1	2

[1] Focus is on the presence of upland plants. [2] Focus is on the presence of aquatic or wetland plants.

Total Points = _____

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.4 WWC Form 009

County: Fayette	Named Waterbody: NA	Date/Time: 2018 11/13
Assessors/Affiliation: M. Suenson		Project ID : WWC 009
Site Name/Description: Yum Yum Solar		
Site Location: Yum Yum, TN		
USGS quad: 03508665	HUC (12 digit): 08010209	Lat/Long: 35.32341, -89.431778
Previous Rainfall (7-days) : 0.52"		
Precipitation this Season vs. Normal : very wet wet average dry drought unknown Source of recent & seasonal precip data : NOAA / NRCS		
Watershed Size :	Photos: Y or N (circle) Number : See photo log	
Soil Type(s) / Geology : Grgl		Source: NRCS
Surrounding Land Use : Agriculture - Cotton		
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe Moderate Slight Absent		

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	X	WWC
2. Defined bed and bank absent, dominated by upland vegetation / grass	X	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	NA	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	X	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	X	Stream
6. Presence of fish (except *Gambusia*)	X	Stream
7. Presence of naturally occurring ground water table connection	X	Stream
8. Flowing water in channel and 7 days since last precipitation in local watershed	X	Stream
9. Evidence watercourse has been used as a supply of drinking water	X	Stream

NOTE : If any Primary Indicators 1-9 = "Yes", then STOP; absent directly contradictory evidence, determination is complete.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.4*

Overall Hydrologic Determination = wet weather Conveyance

Secondary Indicator Score (if applicable) = 9

Justification / Notes : - feature is an erosional feature associated w/ a man made terrace w/in an agricultural field.

This data form is representative of WWC031, WWC036, and WWC037.

Secondary Field Indicator Evaluation

A. **Geomorphology** (Subtotal = 3)	Absent	Weak	Moderate	Strong
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. **Hydrology** (Subtotal = 0)	Absent	Weak	Moderate	Strong
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September) N/A	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in stream bed or sides of channel	No = 0		Yes = 1.5	

C. **Biology** (Subtotal = 6)	Absent	Weak	Moderate	Strong
20. Fibrous roots in channel [1]	3	2	1	0
21. Rooted plants in channel [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	0.5	1	1.5
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel [2]	0	0.5	1	2

[1] Focus is on the presence of upland plants. [2] Focus is on the presence of aquatic or wetland plants.

Total Points = 9

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes : - feature is an erosional feature associated with a ~~st~~ terrace in an agricultural field.

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.4 WWC Form 010

County: Fayette	Named Waterbody: NA	Date/Time: 2018 11/13
Assessors/Affiliation: M. Swenson HDR		Project ID: WWC010 & 011
Site Name/Description: Yum Yum Solar		
Site Location: Yum Yum, TN		
USGS quad: 03508665	HUC (12 digit): 08010209	Lat/Long: 35.3227, -89.4959
Previous Rainfall (7-days): 0.52		
Precipitation this Season vs. Normal: very wet wet (average) dry drought unknown Source of recent & seasonal precip data: NOAA / NRCS		
Watershed Size:	Photos: (Y) or N (circle) Number: See photo log	
Soil Type(s) / Geology: Fu		Source: NRCS
Surrounding Land Use: Agriculture - cotton		
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes): (Severe) Moderate Slight Absent		

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	X	WWC
2. Defined bed and bank absent, dominated by upland vegetation / grass	X	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	N/A	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	X	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	X	Stream
6. Presence of fish (except *Gambusia*)	X	Stream
7. Presence of naturally occurring ground water table connection	X	Stream
8. Flowing water in channel and 7 days since last precipitation in local watershed	X	Stream
9. Evidence watercourse has been used as a supply of drinking water	X	Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then STOP; absent directly contradictory evidence, determination is complete.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.4*

Overall Hydrologic Determination =

Secondary Indicator Score (if applicable) =

Justification / Notes: - Applicable to both features - both features are head cut erosional features w/in agricultural field that drain to the adjacent public road ditch system.
- Hydrology and morphology are driven by the adjacent agricultural practices

This data form is representative of WWC030, WWC032, WWC033, WWC034, and WWC035.

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 2)	Absent	Weak	Moderate	Strong
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal = 0)	Absent	Weak	Moderate	Strong
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September) N/A	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in stream bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal = 6)	Absent	Weak	Moderate	Strong
20. Fibrous roots in channel [1]	3	2	1	0
21. Rooted plants in channel [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	0.5	1	1.5
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28. Wetland plants in channel [2]	0	0.5	1	2

[1] Focus is on the presence of upland plants. [2] Focus is on the presence of aquatic or wetland plants.

Total Points = 8

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes : – Erosional features originating @ headcuts w/in an agricultural field

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.4 WWC Form 011

County: Fayette	Named Waterbody: NA	Date/Time: 2018 11/14
Assessors/Affiliation: L. Manes M, Sweet Sam		Project ID : WWC 012
Site Name/Description: Yum Yum Solar		
Site Location: Yum Yum, TN		
USGS quad: 03508665	HUC (12 digit): 08010209	Lat/Long: 35.325732 -89.413145
Previous Rainfall (7-days) : ~~0.52~~ 0.52		
Precipitation this Season vs. Normal : very wet wet (average) dry drought unknown Source of recent & seasonal precip data : NOAA/NRCS		
Watershed Size :	Photos: (Y) or N (circle) Number : See photo log	
Soil Type(s) / Geology : Fm		Source: NRCS
Surrounding Land Use : Agricultural - cotton		
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : (Severe) Moderate Slight Absent		

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	✓	WWC
2. Defined bed and bank absent, dominated by upland vegetation / grass	~~N/A~~	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	N/A	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	X	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	X	Stream
6. Presence of fish (except *Gambusia*)	X	Stream
7. Presence of naturally occurring ground water table connection	X	Stream
8. Flowing water in channel and 7 days since last precipitation in local watershed	N/A	Stream
9. Evidence watercourse has been used as a supply of drinking water	X	Stream

NOTE : If any Primary Indicators 1-9 = "Yes", then STOP; absent directly contradictory evidence, determination is complete.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.4*

Overall Hydrologic Determination =

Secondary Indicator Score (if applicable) =

Justification / Notes :

This data form is representative for WWC050.

Secondary Field Indicator Evaluation

A. **Geomorphology** (Subtotal = 7.5)	Absent	Weak	Moderate	Strong
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. **Hydrology** (Subtotal = 1)	Absent	Weak	Moderate	Strong
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain N/A	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in stream bed or sides of channel	No = 0		Yes = 1.5	

C. **Biology** (Subtotal = 2)	Absent	Weak	Moderate	Strong
20. Fibrous roots in channel [1]	3	2	1	0
21. Rooted plants in channel [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	0.5	1	1.5
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel [2]	0	0.5	1	2

[1] Focus is on the presence of upland plants. [2] Focus is on the presence of aquatic or wetland plants.

Total Points = 8.5

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.4 WWC Form 012

County: Fayette	Named Waterbody: NA	Date/Time: 2018 11/14
Assessors/Affiliation: M Swanson K. Thomas		Project ID: WWC 13
Site Name/Description: Yum Yum Solar		
Site Location: Yum Yum, TN		
USGS quad: 03508665	HUC (12 digit): 08010209	Lat/Long: 35.329659 -89.413948
Previous Rainfall (7-days): 0.52		
Precipitation this Season vs. Normal: very wet wet average dry drought unknown Source of recent & seasonal precip data:		
Watershed Size:	Photos: Y or N (circle) Number: See photo log	
Soil Type(s) / Geology: He		Source: NRCS
Surrounding Land Use: Agricultural		
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes): Severe Moderate Slight Absent		

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	X	WWC
2. Defined bed and bank absent, dominated by upland vegetation / grass	X	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	N/A	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	X	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	X	Stream
6. Presence of fish (except *Gambusia*)	X	Stream
7. Presence of naturally occurring ground water table connection	X	Stream
8. Flowing water in channel and 7 days since last precipitation in local watershed	X	Stream
9. Evidence watercourse has been used as a supply of drinking water	X	Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then STOP; absent directly contradictory evidence, determination is complete.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.4*

Overall Hydrologic Determination =

Secondary Indicator Score (if applicable) =

Justification / Notes:

This data form is representative for WWC048, WWC049, WWC051.

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 6)	Absent	Weak	Moderate	Strong
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal = 0.5)	Absent	Weak	Moderate	Strong
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain N/A	0	1	2	3
16. Leaf litter in channel (January – September) N/A	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in stream bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal = 5.5)	Absent	Weak	Moderate	Strong
20. Fibrous roots in channel [1]	3	2	1	0
21. Rooted plants in channel [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	0.5	1	1.5
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel [2]	0	0.5	1	2

[1] Focus is on the presence of upland plants. [2] Focus is on the presence of aquatic or wetland plants.

Total Points = 12

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes : - excavated drainage associated w/ ag
- straight - no sinuosity
- no biology

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.4 WWC Form 013

County: Fayette	Named Waterbody: N/A	Date/Time: 1/11/19
Assessors/Affiliation: Katie Lueth, Michael Swenson, HDR		Project ID : KMWWC001
Site Name/Description: Yum Yum Solar		
Site Location: Yum Yum, TN		
USGS quad: 03508655	HUC (12 digit): 08010209	Lat/Long: 35.3244 N -89.45447 W
Previous Rainfall (7-days) : 48 hr 0.64"		
Precipitation this Season vs. Normal : very wet wet average dry drought unknown Source of recent & seasonal precip data :		
Watershed Size :	Photos: Y or N (circle) Number : See photo log	
Soil Type(s) / Geology : Wu		Source: NRCS
Surrounding Land Use : Agriculture		
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe Moderate Slight Absent		

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	X	WWC
2. Defined bed and bank absent, dominated by upland vegetation / grass	X	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	NA	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	NA	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	X	Stream
6. Presence of fish (except *Gambusia*)	X	Stream
7. Presence of naturally occurring ground water table connection	X	Stream
8. Flowing water in channel and 7 days since last precipitation in local watershed	X	Stream
9. Evidence watercourse has been used as a supply of drinking water	X	Stream

NOTE : If any Primary Indicators 1-9 = "Yes", then STOP; absent directly contradictory evidence, determination is complete.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.4*

Overall Hydrologic Determination =

Secondary Indicator Score (if applicable) =

Justification / Notes :

This data form is representative of WWC009, and WWC010.

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 8.5)	Absent	Weak	Moderate	Strong
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal = 3.5)	Absent	Weak	Moderate	Strong
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in stream bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal = 6)	Absent	Weak	Moderate	Strong
20. Fibrous roots in channel [1]	3	2	1	0
21. Rooted plants in channel [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	0.5	1	1.5
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28. Wetland plants in channel [2]	0	0.5	1	2

[1] Focus is on the presence of upland plants. [2] Focus is on the presence of aquatic or wetland plants.

Total Points = 18

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes : Water conveyance adjacent to ag field, road, hydrology manipulated through ag practices including terracing

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.4 WWC Form 014

County: Fayette	Named Waterbody: NA	Date/Time: 1/18/19
Assessors/Affiliation: Katie Lueth, Michael Swenson, HDR		Project ID : Yum Yum C007
Site Name/Description: Yum Yum Solar		
Site Location: Yum Yum, TN		
USGS quad: 0350865S	HUC (12 digit): 08010209	Lat/Long: 35.3307 7444 N -89.453371 W
Previous Rainfall (7-days) : 48 hr 0.64"		

75.31

Precipitation this Season vs. Normal : very wet wet average dry drought unknown

Source of recent & seasonal precip data :

Watershed Size : Photos: Y or N (circle) Number : See photo log

Soil Type(s) / Geology : F, Source: NRCS

Surrounding Land Use : Agriculture

Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) :
Severe Moderate Slight Absent

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	X	WWC
2. Defined bed and bank absent, dominated by upland vegetation / grass	X	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	NA	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	NA	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	X	Stream
6. Presence of fish (except *Gambusia*)	X	Stream
7. Presence of naturally occurring ground water table connection	X	Stream
8. Flowing water in channel and 7 days since last precipitation in local watershed	X	Stream
9. Evidence watercourse has been used as a supply of drinking water	X	Stream

NOTE : If any Primary Indicators 1-9 = "Yes", then STOP; absent directly contradictory evidence, determination is complete.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.4*

Overall Hydrologic Determination =

Secondary Indicator Score (if applicable) =

Justification / Notes :

This data form is representative of WWC006.

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 4)	Absent	Weak	Moderate	Strong
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal = 2)	Absent	Weak	Moderate	Strong
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in stream bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal = 5)	Absent	Weak	Moderate	Strong
20. Fibrous roots in channel [1]	3	2	1	0
21. Rooted plants in channel [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	0.5	1	1.5
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel [2]	0	0.5	1	2

[1] Focus is on the presence of upland plants. [2] Focus is on the presence of aquatic or wetland plants.

Total Points = 11

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes : Associated with drainage from agricultural field, subject to terracing, little to no upland cover

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.4 WWC Form 015

County: Fayette	Named Waterbody: NA	Date/Time: 1/14/18
Assessors/Affiliation: Katie Lueth, Michael Swenson, HDR		Project ID : EMWWC003
Site Name/Description: Yum Yum Solar		
Site Location: Yum Yum, TN		
USGS quad: 03508655	HUC (12 digit): 08010209	Lat/Long: 35.3300815 N -89.2502816
Previous Rainfall (7-days) : 48 hr 0.64"		
Precipitation this Season vs. Normal : very wet wet average dry drought unknown Source of recent & seasonal precip data :		
Watershed Size :	Photos: Y or N (circle) Number : See photo log	
Soil Type(s) / Geology : Fu		Source: NRCS
Surrounding Land Use : Agriculture		
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe Moderate Slight Absent		

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	X	WWC
2. Defined bed and bank absent, dominated by upland vegetation / grass	X	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	NA	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	NA	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	X	Stream
6. Presence of fish (except *Gambusia*)	X	Stream
7. Presence of naturally occurring ground water table connection	X	Stream
8. Flowing water in channel and 7 days since last precipitation in local watershed	X	Stream
9. Evidence watercourse has been used as a supply of drinking water	X	Stream

NOTE : If any Primary Indicators 1-9 = "Yes", then STOP; absent directly contradictory evidence, determination is complete.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.4*

Overall Hydrologic Determination = This data form is representative of WWC004 and WWC005.

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 3)	Absent	Weak	Moderate	Strong
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal = 2)	Absent	Weak	Moderate	Strong
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in stream bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal = 5.5)	Absent	Weak	Moderate	Strong
20. Fibrous roots in channel [1]	3	2	1	0
21. Rooted plants in channel [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	0.5	1	1.5
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel [2]	0	0.5	1	2

[1] Focus is on the presence of upland plants. [2] Focus is on the presence of aquatic or wetland plants.

Total Points = 10.5

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes : Channel within forested break between agricultural fields associated with ag. drainage and heavily modified to suit agricultural purposes. Channel ends at tree line

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.4 WWC Form 016

County: Fayette	Named Waterbody: NA	Date/Time: 1/11/18 2:24
Assessors/Affiliation: Katie Lueth, Michael Swenson, HDR		Project ID: KMWWC004
Site Name/Description: Yum Yum Solar		
Site Location: Yum Yum, TN		
USGS quad: 03508665	HUC (12 digit): 08010209	Lat/Long: 35.32094212 N -89.4427513 W
Previous Rainfall (7-days): 48 hr 0.64"		
Precipitation this Season vs. Normal: very wet (wet) average dry drought unknown Source of recent & seasonal precip data:		
Watershed Size:	Photos: (Y) or N (circle) Number: See photo log	
Soil Type(s) / Geology: Fu		Source: NRCS
Surrounding Land Use: Agriculture		
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes): (Severe) Moderate Slight Absent		

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	X	WWC
2. Defined bed and bank absent, dominated by upland vegetation / grass	X	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	NA	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	NA	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	X	Stream
6. Presence of fish (except *Gambusia*)	X	Stream
7. Presence of naturally occurring ground water table connection	X	Stream
8. Flowing water in channel and 7 days since last precipitation in local watershed	X	Stream
9. Evidence watercourse has been used as a supply of drinking water	X	Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then STOP; absent directly contradictory evidence, determination is complete.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.4*

Overall Hydrologic Determination =

Secondary Indicator Score (if applicable) =

Justification / Notes:

This data form is representative of WWC028.

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 2)	Absent	Weak	Moderate	Strong
1. Continuous bed and bank	0	0	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	0	2	3
5. Active/relic floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal = 1.5)	Absent	Weak	Moderate	Strong
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in stream bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal = 5)	Absent	Weak	Moderate	Strong
20. Fibrous roots in channel [1]	3	2	1	0
21. Rooted plants in channel [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	0.5	1	1.5
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel [2]	0	0.5	1	2

[1] Focus is on the presence of upland plants. [2] Focus is on the presence of aquatic or wetland plants.

Total Points = 8.5

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.4

WWC Form 017

County: Fayette	Named Waterbody: NA	Date/Time: 1/14/18
Assessors/Affiliation: Katie Lueth, Michael Swenson HDR		Project ID : MKWWC005
Site Name/Description: Yum Yum Solar		
Site Location: Yum Yum, TN		
USGS quad: 03508665	HUC (12 digit): 08010209	Lat/Long: 35.31876382 N - 89.43905173 W
Previous Rainfall (7-days) : 48 hr 0.64"		
Precipitation this Season vs. Normal : very wet wet average dry drought unknown Source of recent & seasonal precip data :		
Watershed Size :	Photos: Y or N (circle) Number : See photo log	
Soil Type(s) / Geology : GaC3		Source: NRCS
Surrounding Land Use : Agriculture		
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe Moderate Slight Absent		

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	X	WWC
2. Defined bed and bank absent, dominated by upland vegetation / grass	X	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	NA	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	NA	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	X	Stream
6. Presence of fish (except *Gambusia*)	X	Stream
7. Presence of naturally occurring ground water table connection	X	Stream
8. Flowing water in channel and 7 days since last precipitation in local watershed	X	Stream
9. Evidence watercourse has been used as a supply of drinking water	X	Stream

NOTE : If any Primary Indicators 1-9 = "Yes", then STOP; absent directly contradictory evidence, determination is complete.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.4*

Overall Hydrologic Determination =

Secondary Indicator Score (if applicable) =

Justification / Notes :

This data form is representative of WWC029.

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 2)	Absent	Weak	Moderate	Strong
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal = 1)	Absent	Weak	Moderate	Strong
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in stream bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal = 5.5)	Absent	Weak	Moderate	Strong
20. Fibrous roots in channel [1]	3	2	1	0
21. Rooted plants in channel [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	0.5	1	1.5
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel [2]	0	0.5	1	2

[1] Focus is on the presence of upland plants. [2] Focus is on the presence of aquatic or wetland plants.

Total Points = 8.5

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.4 WWC Form 018

County: Fayette	Named Waterbody: NA	Date/Time: 1/18/18 4:26
Assessors/Affiliation: Katie Lueth, Michael Swenson HDR		Project ID: KMWWC006
Site Name/Description: Yum Yum Solar		
Site Location: Yum Yum TN		
USGS quad: 03508665	HUC (12 digit): 08010209	Lat/Long: 35.32646N -84.43884
Previous Rainfall (7-days): 48 hr 0.64"		
Precipitation this Season vs. Normal: very wet wet average dry drought unknown Source of recent & seasonal precip data:		
Watershed Size:	Photos: Y or N (circle) Number: See photo log	
Soil Type(s) / Geology: Ht		Source: NRCS
Surrounding Land Use: Agriculture		
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes): Severe Moderate Slight Absent		

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	X	WWC
2. Defined bed and bank absent, dominated by upland vegetation / grass	X	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	NA	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	NA	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	X	Stream
6. Presence of fish (except *Gambusia*)	X	Stream
7. Presence of naturally occurring ground water table connection	X	Stream
8. Flowing water in channel and 7 days since last precipitation in local watershed	X	Stream
9. Evidence watercourse has been used as a supply of drinking water	X	Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then STOP; absent directly contradictory evidence, determination is complete.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.4*

Overall Hydrologic Determination =

Secondary Indicator Score (if applicable) =

Justification / Notes:

This data form is representative of WWC016.

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 2)	Absent	Weak	Moderate	Strong
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal = 2)	Absent	Weak	Moderate	Strong
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in stream bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal = 4.5)	Absent	Weak	Moderate	Strong
20. Fibrous roots in channel [1]	3	2	1	0
21. Rooted plants in channel [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	0.5	1	1.5
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel [2]	0	0.5	1	2

[1] Focus is on the presence of upland plants. [2] Focus is on the presence of aquatic or wetland plants.

Total Points = 8.5

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.4 WWC Form 019

County: Fayette	Named Waterbody: NA	Date/Time: 1/14/16 [illegible]
Assessors/Affiliation: Kate Lueth, Michael Swenson HDR		Project ID : WWC007
Site Name/Description: Yum Yum Solar		
Site Location: Yum, Yum, TN		
USGS quad: 03508665	HUC (12 digit): 08010209	Lat/Long: 35.3271 30 49 -84.4402 1316
Previous Rainfall (7-days) : 48 hr 0.64"		
Precipitation this Season vs. Normal : very wet wet average dry drought unknown Source of recent & seasonal precip data :		
Watershed Size :	Photos: Y or N (circle) Number : See photo log	
Soil Type(s) / Geology : Fm		Source: NRCS
Surrounding Land Use : Agriculture		
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe Moderate Slight Absent		

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	X	WWC
2. Defined bed and bank absent, dominated by upland vegetation / grass	X	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	NA	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	NA	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	X	Stream
6. Presence of fish (except *Gambusia*)	X	Stream
7. Presence of naturally occurring ground water table connection	X	Stream
8. Flowing water in channel and 7 days since last precipitation in local watershed	X	Stream
9. Evidence watercourse has been used as a supply of drinking water	X	Stream

NOTE : If any Primary Indicators 1-9 = "Yes", then STOP; absent directly contradictory evidence, determination is complete.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.4*

Overall Hydrologic Determination =

Secondary Indicator Score (if applicable) =

Justification / Notes :

This data form is representative of WWC014, WWC015.

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 3)	Absent	Weak	Moderate	Strong
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal = 1.5)	Absent	Weak	Moderate	Strong
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in stream bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal = 6)	Absent	Weak	Moderate	Strong
20. Fibrous roots in channel [1]	3	2	1	0
21. Rooted plants in channel [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	0.5	1	1.5
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel [2]	0	0.5	1	2

[1] Focus is on the presence of upland plants. [2] Focus is on the presence of aquatic or wetland plants.

Total Points = 10.5

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes : Associated with forested beaver and ag flow

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.4 WWC Form 020

County: Fayette	Named Waterbody: NA	Date/Time: 1/15/18 9:48
Assessors/Affiliation: Katie Lueth, Michael Swenson HDR		Project ID: KMWWC008
Site Name/Description: Yum Yum Solar		
Site Location: Yum Yum, TN		
USGS quad: 03508665	HUC (12 digit): 08010209	Lat/Long: 35.3327448 -84.3774073
Previous Rainfall (7-days): 48 hr 0.64"		
Precipitation this Season vs. Normal: very wet wet average dry drought unknown Source of recent & seasonal precip data:		
Watershed Size:	Photos: Y or N (circle) Number: See photo log	
Soil Type(s) / Geology: LoC3		Source: NRCS
Surrounding Land Use: Agriculture		
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes): Severe Moderate Slight Absent		

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	X	WWC
2. Defined bed and bank absent, dominated by upland vegetation / grass	X	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	NA	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	NA	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	X	Stream
6. Presence of fish (except *Gambusia*)	X	Stream
7. Presence of naturally occurring ground water table connection	X	Stream
8. Flowing water in channel and 7 days since last precipitation in local watershed	X	Stream
9. Evidence watercourse has been used as a supply of drinking water	X	Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then STOP; absent directly contradictory evidence, determination is complete.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.4*

Overall Hydrologic Determination =

Secondary Indicator Score (if applicable) =

Justification / Notes:

This data form is representative of WWC094.

Secondary Field Indicator Evaluation

A. **Geomorphology** (Subtotal 2.5)	Absent	Weak	Moderate	Strong
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. **Hydrology** (Subtotal = 2)	Absent	Weak	Moderate	Strong
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in stream bed or sides of channel	No = 0		Yes = 1.5	

C. **Biology** (Subtotal = 6.5)	Absent	Weak	Moderate	Strong
20. Fibrous roots in channel [1]	3	2	1	0
21. Rooted plants in channel [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	0.5	1	1.5
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28. Wetland plants in channel [2]	0	0.5	1	2

[1] Focus is on the presence of upland plants. [2] Focus is on the presence of aquatic or wetland plants.

Total Points = 11

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.4 WWC Form 021

County: Fayette	Named Waterbody: NA	Date/Time: 1/15/19 9:57
Assessors/Affiliation: Kate Lueth, Michael Swenson HDR		Project ID : KM3UWC.001
Site Name/Description: Yum Yum Solar		
Site Location: Yum Yum, TN		
USGS quad: 035086b 5	HUC (12 digit): 08010209	Lat/Long: 35.353.350 -89.37931317
Previous Rainfall (7-days) : 48 hr 0.64"		
Precipitation this Season vs. Normal : very wet wet average dry drought unknown Source of recent & seasonal precip data :		
Watershed Size :	Photos: Y or N (circle) Number : See photo log	
Soil Type(s) / Geology : Fu		Source: NRCS
Surrounding Land Use : Agriculture		
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe Moderate Slight Absent		

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	X	WWC
2. Defined bed and bank absent, dominated by upland vegetation / grass	X	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	NA	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	NA	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	X	Stream
6. Presence of fish (except *Gambusia*)	X	Stream
7. Presence of naturally occurring ground water table connection	X	Stream
8. Flowing water in channel and 7 days since last precipitation in local watershed	X	Stream
9. Evidence watercourse has been used as a supply of drinking water	X	Stream

NOTE : If any Primary Indicators 1-9 = "Yes", then STOP; absent directly contradictory evidence, determination is complete.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.4*

Overall Hydrologic Determination =

Secondary Indicator Score (if applicable) =

Justification / Notes :

This data form is representative of WWC069.

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 4.5)	Absent	Weak	Moderate	Strong
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal = 2.5)	Absent	Weak	Moderate	Strong
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in stream bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal = 6)	Absent	Weak	Moderate	Strong
20. Fibrous roots in channel [1]	3	2	1	0
21. Rooted plants in channel [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	0.5	1	1.5
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28. Wetland plants in channel [2]	0	0.5	1	2

[1] Focus is on the presence of upland plants. [2] Focus is on the presence of aquatic or wetland plants.

Total Points = 13

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.4 WWC Form 022

County: Fayette	Named Waterbody: NA	Date/Time: 1/15/19 10:02
Assessors/Affiliation: Katie Lueth, Michael Swenson HDR		Project ID : KMDWWCOPO (associated with 0091)
Site Name/Description: Yum Yum Solar		
Site Location: Yum Yum, TN		
USGS quad: 03508655	HUC (12 digit): 08010209	Lat/Long: 35.334016 -89.380479
Previous Rainfall (7-days) : 48hr 0.64"		
Precipitation this Season vs. Normal : very wet (wet) average dry drought unknown Source of recent & seasonal precip data :		
Watershed Size :	Photos: (Y) or N (circle) Number :See photo log	
Soil Type(s) / Geology : Gs		Source: NRCS
Surrounding Land Use : Agriculture		
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe Moderate Slight Absent		

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	X	WWC
2. Defined bed and bank absent, dominated by upland vegetation / grass	X	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	NA	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	NA	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	X	Stream
6. Presence of fish (except *Gambusia*)	X	Stream
7. Presence of naturally occurring ground water table connection	X	Stream
8. Flowing water in channel and 7 days since last precipitation in local watershed	X	Stream
9. Evidence watercourse has been used as a supply of drinking water	X	Stream

NOTE : If any Primary Indicators 1-9 = "Yes", then STOP; absent directly contradictory evidence, determination is complete.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.4*

Overall Hydrologic Determination =

Secondary Indicator Score (if applicable) =

Justification / Notes :

This data form is representative of WWC074 and WWC073.

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 4.5)	Absent	Weak	Moderate	Strong
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal = 2.5)	Absent	Weak	Moderate	Strong
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in stream bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal = 6)	Absent	Weak	Moderate	Strong
20. Fibrous roots in channel [1]	3	2	1	0
21. Rooted plants in channel [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	0.5	1	1.5
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel [2]	0	0.5	1	2

[1] Focus is on the presence of upland plants. [2] Focus is on the presence of aquatic or wetland plants.

Total Points = 13

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes : Associated with KMWWC009

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.4 WWC Form 023

County: Fayette	Named Waterbody: NA	Date/Time: 1/15/19 10:13
Assessors/Affiliation: Katie Lueth, Michael Swenson, HDR		Project ID : KMWWC011 associated w/ ...
Site Name/Description: Yum Yum Solar		
Site Location: Yum Yum, TN		
USGS quad: 03508655	HUC (12 digit): 08010209	Lat/Long: 35.33236753 -89.38170273
Previous Rainfall (7-days) : 48 hr 0.64"		
Precipitation this Season vs. Normal : very wet wet average dry drought unknown Source of recent & seasonal precip data :		
Watershed Size :	Photos: Y or N (circle) Number : See photo log	
Soil Type(s) / Geology : Ios		Source: NRCS
Surrounding Land Use : Agriculture		
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe Moderate Slight Absent		

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	X	WWC
2. Defined bed and bank absent, dominated by upland vegetation / grass	X	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	NA	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	NA	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	X	Stream
6. Presence of fish (except *Gambusia*)	X	Stream
7. Presence of naturally occurring ground water table connection	X	Stream
8. Flowing water in channel and 7 days since last precipitation in local watershed	X	Stream
9. Evidence watercourse has been used as a supply of drinking water	X	Stream

NOTE : If any Primary Indicators 1-9 = "Yes", then STOP; absent directly contradictory evidence, determination is complete.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.4*

Overall Hydrologic Determination =

Secondary Indicator Score (if applicable) =

Justification / Notes :

This data form is representative of WWC072.

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 4.5)	Absent	Weak	Moderate	Strong
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal = 2.5)	Absent	Weak	Moderate	Strong
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in stream bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal = 6)	Absent	Weak	Moderate	Strong
20. Fibrous roots in channel [1]	3	2	1	0
21. Rooted plants in channel [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	0.5	1	1.5
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28. Wetland plants in channel [2]	0	0.5	1	2

[1] Focus is on the presence of upland plants. [2] Focus is on the presence of aquatic or wetland plants.

Total Points = 13

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.4 WWC Form 024

County: Fayette	Named Waterbody: NA	Date/Time: 1/15/19 10:14
Assessors/Affiliation: Katie Lueth, Michael Swenson, HDR		Project ID : KMWWC012
Site Name/Description: Yum Yum Solar		
Site Location: Yum Yum, TN		
USGS quad: 03508665	HUC (12 digit): 08010209	Lat/Long: 35.3314 3668 -89.38 33848
Previous Rainfall (7-days) : 0.64" 48 hr		
Precipitation this Season vs. Normal : very wet wet average dry drought unknown Source of recent & seasonal precip data :		
Watershed Size :	Photos: Y or N (circle) Number : See photo log	
Soil Type(s) / Geology : LoC3		Source: NRCS
Surrounding Land Use : Agriculture		
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe Moderate Slight Absent		

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	X	WWC
2. Defined bed and bank absent, dominated by upland vegetation / grass	X	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	NA	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	NA	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	X	Stream
6. Presence of fish (except *Gambusia*)	X	Stream
7. Presence of naturally occurring ground water table connection	X	Stream
8. Flowing water in channel and 7 days since last precipitation in local watershed	X	Stream
9. Evidence watercourse has been used as a supply of drinking water	X	Stream

NOTE : If any Primary Indicators 1-9 = "Yes", then STOP; absent directly contradictory evidence, determination is complete.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.4*

Overall Hydrologic Determination =

Secondary Indicator Score (if applicable) =

Justification / Notes :

This data form is representative of WWC070.

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 2.5)	Absent	Weak	Moderate	Strong
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal = 3)	Absent	Weak	Moderate	Strong
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in stream bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal = 4.5)	Absent	Weak	Moderate	Strong
20. Fibrous roots in channel [1]	3	2	1	0
21. Rooted plants in channel [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	0.5	1	1.5
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28. Wetland plants in channel [2]	0	0.5	1	2

[1] Focus is on the presence of upland plants. [2] Focus is on the presence of aquatic or wetland plants.

Total Points = 10

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes : WWC associated with ag field, and modified terrace. Flows into wood break associated with ag field.

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.4 WWC Form 025

County: Fayette	Named Waterbody: NA	Date/Time: 1/15/19 10:32
Assessors/Affiliation: Katie Lurth, Michael Swenson, HDR		Project ID : KMWWC013
Site Name/Description: Yum Yum Solar		
Site Location: Yum Yum, TN		
USGS quad: 03508665	HUC (12 digit): 08010209	Lat/Long: 35.3305604 -89.3813704
Previous Rainfall (7-days) : 0.64" 48 hr		
Precipitation this Season vs. Normal : very wet wet average dry drought unknown Source of recent & seasonal precip data :		
Watershed Size :	Photos: Y or N (circle) Number : See photo log	
Soil Type(s) / Geology : FU		Source: NRCS
Surrounding Land Use : Agriculture		
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe Moderate Slight Absent		

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	X	WWC
2. Defined bed and bank absent, dominated by upland vegetation / grass	X	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	NA	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	NA	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	X	Stream
6. Presence of fish (except *Gambusia*)	X	Stream
7. Presence of naturally occurring ground water table connection	X	Stream
8. Flowing water in channel and 7 days since last precipitation in local watershed	X	Stream
9. Evidence watercourse has been used as a supply of drinking water	X	Stream

NOTE : If any Primary Indicators 1-9 = "Yes", then STOP; absent directly contradictory evidence, determination is complete.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.4*

Overall Hydrologic Determination =

Secondary Indicator Score (if applicable) =

Justification / Notes :

This data form is representative of WWC094, and WWC095.

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 2)	Absent	Weak	Moderate	Strong
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal = 3)	Absent	Weak	Moderate	Strong
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in stream bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal = 2.5)	Absent	Weak	Moderate	Strong
20. Fibrous roots in channel [1]	3	2	1	0
21. Rooted plants in channel [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	0.5	1	1.5
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28. Wetland plants in channel [2]	0	0.5	1	2

[1] Focus is on the presence of upland plants. [2] Focus is on the presence of aquatic or wetland plants.

Total Points = 7.5

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.4

WWC Form 026

County: Fayette	Named Waterbody: NA	Date/Time: 1/15/18
Assessors/Affiliation: Kate Lueth, Michael Swenson HDR		Project ID : KMWWC004
Site Name/Description: Yum Yum Solar		
Site Location: Yum Yum TN		
USGS quad: 03508665	HUC (12 digit): 08010209	Lat/Long: 35.3242403 6 -84.3746147 2
Previous Rainfall (7-days) : 48 hr. 0.64"		
Precipitation this Season vs. Normal : very wet (wet) average dry drought unknown Source of recent & seasonal precip data :		
Watershed Size :	Photos: (Y) or N (circle) Number : See photo log	
Soil Type(s) / Geology : GaC3		Source: NRCS
Surrounding Land Use : Agriculture		
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe Moderate (Moderate) Slight Absent		

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	X	WWC
2. Defined bed and bank absent, dominated by upland vegetation / grass	X	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	NA	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	NA	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	X	Stream
6. Presence of fish (except *Gambusia*)	X	Stream
7. Presence of naturally occurring ground water table connection	X	Stream
8. Flowing water in channel and 7 days since last precipitation in local watershed	X	Stream
9. Evidence watercourse has been used as a supply of drinking water	X	Stream

NOTE : If any Primary Indicators 1-9 = "Yes", then STOP; absent directly contradictory evidence, determination is complete.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.4*

Overall Hydrologic Determination =

Secondary Indicator Score (if applicable) =

Justification / Notes :

This form is representative of WWC096.

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 4)	Absent	Weak	Moderate	Strong
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal = 2.5)	Absent	Weak	Moderate	Strong
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in stream bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal = 5.5)	Absent	Weak	Moderate	Strong
20. Fibrous roots in channel [1]	3	2	1	0
21. Rooted plants in channel [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	0.5	1	1.5
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28. Wetland plants in channel [2]	0	0.5	1	2

[1] Focus is on the presence of upland plants. [2] Focus is on the presence of aquatic or wetland plants.

Total Points = 12

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.4 WWC Form 027

County: Fayette	Named Waterbody: NA	Date/Time: 1/15/19 1:22
Assessors/Affiliation: Kate Lueth, Michael Swenson HDR		Project ID : KMWWC015
Site Name/Description: Yum Yum Solar		
Site Location: Yum Yum TN		
USGS quad: 035086b5	HUC (12 digit): 08010209	Lat/Long: 35.335679 -89.365186
Previous Rainfall (7-days) : 48 hr 0.64"		
Precipitation this Season vs. Normal : very wet wet average dry drought unknown Source of recent & seasonal precip data :		
Watershed Size :	Photos: Y or N (circle) Number : See photo log	
Soil Type(s) / Geology : Hc		Source: NRCS
Surrounding Land Use : Agriculture		
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe Moderate Slight Absent		

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	X	WWC
2. Defined bed and bank absent, dominated by upland vegetation / grass	X	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	NA	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	NA	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	X	Stream
6. Presence of fish (except *Gambusia*)	X	Stream
7. Presence of naturally occurring ground water table connection	X	Stream
8. Flowing water in channel and 7 days since last precipitation in local watershed	X	Stream
9. Evidence watercourse has been used as a supply of drinking water	X	Stream

NOTE : If any Primary Indicators 1-9 = "Yes", then STOP; absent directly contradictory evidence, determination is complete.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.4*

Overall Hydrologic Determination =

Secondary Indicator Score (if applicable) =

Justification / Notes :

This data form is representative of WWC098, WWC099, WWC100, WWC101, WWC102, WWC103, WWC104, and WWC105.

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 6)	Absent	Weak	Moderate	Strong
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal = 2.5)	Absent	Weak	Moderate	Strong
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in stream bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal = 3.5)	Absent	Weak	Moderate	Strong
20. Fibrous roots in channel [1]	3	2	1	0
21. Rooted plants in channel [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	0.5	1	1.5
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel [2]	0	0.5	1	2

[1] Focus is on the presence of upland plants. [2] Focus is on the presence of aquatic or wetland plants.

Total Points = 12

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.4 WWC Form 028

County: Fayette	Named Waterbody: NA	Date/Time: 1/15/19 3:01
Assessors/Affiliation: Katie Lueth, Michael Swenson, HDR		Project ID : KMWWC014
Site Name/Description: Yum Yum Solar		
Site Location: Yum Yum TN		
USGS quad: 03508665	HUC (12 digit): 08010709	Lat/Long: 35.33083375 -84.36432568
Previous Rainfall (7-days) : 0.64"		
Precipitation this Season vs. Normal : very wet (wet) average dry drought unknown Source of recent & seasonal precip data :		
Watershed Size :	Photos: (Y) or N (circle) Number : See photo log	
Soil Type(s) / Geology :		Source: NRCS
Surrounding Land Use : Agriculture		
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe (Moderate) Slight Absent		

KMWWC016

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	X	WWC
2. Defined bed and bank absent, dominated by upland vegetation / grass	X	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	NA	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	NA	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	X	Stream
6. Presence of fish (except *Gambusia*)	X	Stream
7. Presence of naturally occurring ground water table connection	X	Stream
8. Flowing water in channel and 7 days since last precipitation in local watershed	X	Stream
9. Evidence watercourse has been used as a supply of drinking water	X	Stream

NOTE : If any Primary Indicators 1-9 = "Yes", then STOP; absent directly contradictory evidence, determination is complete.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.4*

Overall Hydrologic Determination =

Secondary Indicator Score (if applicable) =

Justification / Notes :

This data form is representative of WWC096, WWC097.

Secondary Field Indicator Evaluation

A. **Geomorphology** (Subtotal = 6)	Absent	Weak	Moderate	Strong
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. **Hydrology** (Subtotal = 2.5)	Absent	Weak	Moderate	Strong
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in stream bed or sides of channel	No = 0		Yes = 1.5	

C. **Biology** (Subtotal = 6)	Absent	Weak	Moderate	Strong
20. Fibrous roots in channel [1]	3	2	1	0
21. Rooted plants in channel [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	0.5	1	1.5
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel [2]	0	0.5	1	2

[1] Focus is on the presence of upland plants. [2] Focus is on the presence of aquatic or wetland plants.

Total Points = 14.5

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.4 WWC Form 029

County: Fayette	Named Waterbody: NA	Date/Time: 1/16/19 10:23
Assessors/Affiliation: Katie Lueth, Michael Swenson, HDR		Project ID : KMGWWC017
Site Name/Description: Yum Yum Solar		
Site Location: Yum Yum, TN		
USGS quad: 03508665	HUC (12 digit): 08010204	Lat/Long: 35.31822641 -89.3461701b
Previous Rainfall (7-days) : 0.64"		
Precipitation this Season vs. Normal : very wet wet average dry drought unknown Source of recent & seasonal precip data :		
Watershed Size :	Photos: Y or N (circle) Number : See photo log	
Soil Type(s) / Geology : Fu		Source: NRCS
Surrounding Land Use : Agriculture		
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe Moderate Slight Absent		

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	X	WWC
2. Defined bed and bank absent, dominated by upland vegetation / grass		WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	NA	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	NA	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	X	Stream
6. Presence of fish (except *Gambusia*)	X	Stream
7. Presence of naturally occurring ground water table connection	X	Stream
8. Flowing water in channel and 7 days since last precipitation in local watershed	X	Stream
9. Evidence watercourse has been used as a supply of drinking water	X	Stream

NOTE : If any Primary Indicators 1-9 = "Yes", then STOP; absent directly contradictory evidence, determination is complete.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.4*

Overall Hydrologic Determination =

Secondary Indicator Score (if applicable) =

Justification / Notes :

This data form is representative of WWC058, WWC059, WWC060 and WWC061.

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 1)	Absent	Weak	Moderate	Strong
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal = 1.5)	Absent	Weak	Moderate	Strong
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in stream bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal = 4)	Absent	Weak	Moderate	Strong
20. Fibrous roots in channel [1]	3	2	1	0
21. Rooted plants in channel [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	0.5	1	1.5
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel [2]	0	0.5	1	2

[1] Focus is on the presence of upland plants. [2] Focus is on the presence of aquatic or wetland plants.

Total Points = 7.5

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.4 WWC Form 033

County: Fayette	Named Waterbody: N/A	Date/Time: 14 JAN 2019 1115
Assessors/Affiliation: Ryan Hammons, Tara Kent		Project ID : 14WWC1
Site Name/Description: 14 WWC 1 Yum Yum Solar		
Site Location: Yum Yum, TN		
USGS quad: 03508665	HUC (12 digit): 08010209	Lat/Long: 35.3304 -89.453341
Previous Rainfall (7-days) : 48hr 0.64"		
Precipitation this Season vs. Normal : very wet X wet average dry drought unknown Source of recent & seasonal precip data :		
Watershed Size :	Photos: Y or N (circle) Number : See photo log	
Soil Type(s) / Geology : FU		Source: NRCS
Surrounding Land Use : Agriculture		
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe Moderate Slight Absent		

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	X	WWC
2. Defined bed and bank absent, dominated by upland vegetation / grass	X	~~WWC~~
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	NA	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	NA	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	X	Stream
6. Presence of fish (except *Gambusia*)	X	Stream
7. Presence of naturally occurring ground water table connection	X	Stream
8. Flowing water in channel and 7 days since last precipitation in local watershed	X	Stream
9. Evidence watercourse has been used as a supply of drinking water	X	Stream

NOTE : If any Primary Indicators 1-9 = "Yes", then STOP; absent directly contradictory evidence, determination is complete.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.4*

Overall Hydrologic Determination =

Secondary Indicator Score (if applicable) =

Justification / Notes : Johnson grass soybean adjacent ag field drainage w/ head cut starting in field

This data form is representative for WWC007.

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 5)	Absent	Weak	Moderate	Strong
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0 ?		Yes = 3	

B. Hydrology (Subtotal = 5.5)	Absent	Weak	Moderate	Strong
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in stream bed or sides of channel	No = 0		Yes = 1.5	

ag field rust

C. Biology (Subtotal = 5)	Absent	Weak	Moderate	Strong
20. Fibrous roots in channel [1]	3	2	1	0
21. Rooted plants in channel [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	0.5	1	1.5
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28. Wetland plants in channel [2]	0	0.5	1	2

[1] Focus is on the presence of upland plants. [2] Focus is on the presence of aquatic or wetland plants.

Total Points = 15.5

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.4 WWC Form 034

County: Fayette	Named Waterbody: NA	Date/Time: 1/14/2019
Assessors/Affiliation: Ryan Hammons, Tara Kent, HDR		Project ID : 14WWC2
Site Name/Description: Yum Yum Solar		
Site Location: 14WWC2 Yum Yum TN		
USGS quad: 035086bS	HUC (12 digit): 08010209	Lat/Long: 35.33325 -89.455366
Previous Rainfall (7-days) : 0.64"		
Precipitation this Season vs. Normal : very wet X wet average dry drought unknown Source of recent & seasonal precip data :		
Watershed Size :	Photos: (Y) or N (circle) Number : See photo log	
Soil Type(s) / Geology : GaC3		Source: NRCS
Surrounding Land Use : Wooded area surrounded by ag		
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe Moderate Slight Absent		

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	X	WWC
2. Defined bed and bank absent, dominated by upland vegetation / grass	X	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions		WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	NA	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	X	Stream
6. Presence of fish (except *Gambusia*)	X	Stream
7. Presence of naturally occurring ground water table connection	X	Stream
8. Flowing water in channel and 7 days since last precipitation in local watershed	X	Stream
9. Evidence watercourse has been used as a supply of drinking water	X	Stream

NOTE : If any Primary Indicators 1-9 = "Yes", then STOP; absent directly contradictory evidence, determination is complete.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.4*

Overall Hydrologic Determination =

Secondary Indicator Score (if applicable) =

Justification / Notes : Smilax in the woods
sweet gum

This data form is representative of WWC001, WWC002, WWC008.

Secondary Field Indicator Evaluation

A. **Geomorphology** (Subtotal =)	Absent	Weak	Moderate	Strong
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. **Hydrology** (Subtotal =)	Absent	Weak	Moderate	Strong
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in stream bed or sides of channel	No = 0		Yes = 1.5	

C. **Biology** (Subtotal =)	Absent	Weak	Moderate	Strong
20. Fibrous roots in channel [1]	3	2	1	0
21. Rooted plants in channel [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	0.5	1	1.5
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel [2]	0	0.5	1	2

[1] Focus is on the presence of upland plants. [2] Focus is on the presence of aquatic or wetland plants.

Total Points = _____

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.4 WWC Form 035

County: Fayette	Named Waterbody: NA	Date/Time: 1/14/19 1310
Assessors/Affiliation: Ryan Hemmons, Tara Kent		Project ID : 14WWC3
Site Name/Description: Yum Yum Solar		
Site Location: 14 WWC 3 Yum Yum, TN		
USGS quad: 03508665	HUC (12 digit): 08010209	Lat/Long: 35.334712 -89.453371
Previous Rainfall (7-days) : 0.64"		
Precipitation this Season vs. Normal : very wet wet average dry drought unknown Source of recent & seasonal precip data :		
Watershed Size :	Photos: Y or N (circle) Number : See photo log	
Soil Type(s) / Geology : CaB2		Source: NRCS
Surrounding Land Use : Agriculture		
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe Moderate Slight Absent		

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	X	WWC
2. Defined bed and bank absent, dominated by upland vegetation / grass		WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	NA	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	NA	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	X	Stream
6. Presence of fish (except *Gambusia*)	X	Stream
7. Presence of naturally occurring ground water table connection	X	Stream
8. Flowing water in channel and 7 days since last precipitation in local watershed	X	Stream
9. Evidence watercourse has been used as a supply of drinking water	X	Stream

NOTE : If any Primary Indicators 1-9 = "Yes", then STOP; absent directly contradictory evidence, determination is complete.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.4*

Overall Hydrologic Determination =

Secondary Indicator Score (if applicable) =

Justification / Notes : J. honeysuckle red cedar Solidago
Bermuda
surrounding ag fields sweet gum

This data form is representative of WWC002.

Secondary Field Indicator Evaluation

A. **Geomorphology** (Subtotal =)	Absent	Weak	Moderate	Strong
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. **Hydrology** (Subtotal =)	Absent	Weak	Moderate	Strong
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in stream bed or sides of channel	No = 0		Yes = 1.5	

C. **Biology** (Subtotal =)	Absent	Weak	Moderate	Strong
20. Fibrous roots in channel [1]	3	2	1	0
21. Rooted plants in channel [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	0.5	1	1.5
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel [2]	0	0.5	1	2

[1] Focus is on the presence of upland plants. [2] Focus is on the presence of aquatic or wetland plants.

Total Points = _____

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.4 WWC Form 036

County: Fayette	Named Waterbody: NA	Date/Time: 1/14/19 1325
Assessors/Affiliation: Ryan Hammons, Tara Kent HDR		Project ID : 14WWC4
Site Name/Description: 14WWC4 Yum Yum Solar		
Site Location: Yum Yum TN		
USGS quad: 035086bS	HUC (12 digit): 08010209	Lat/Long: 35.334767 -89.450845
Previous Rainfall (7-days) : 0.64"		
Precipitation this Season vs. Normal : very wet wet average dry drought unknown Source of recent & seasonal precip data :		
Watershed Size :	Photos: Y or N (circle) Number : See photo log	
Soil Type(s) / Geology : Fu		Source: NRCS
Surrounding Land Use : Agriculture		
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe Moderate Slight Absent		

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	X	WWC
2. Defined bed and bank absent, dominated by upland vegetation / grass		WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	NA	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	NA	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	X	Stream
6. Presence of fish (except *Gambusia*)	X	Stream
7. Presence of naturally occurring ground water table connection	X	Stream
8. Flowing water in channel and 7 days since last precipitation in local watershed	X	Stream
9. Evidence watercourse has been used as a supply of drinking water	X	Stream

NOTE : If any Primary Indicators 1-9 = "Yes", then STOP; absent directly contradictory evidence, determination is complete.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.4*

Overall Hydrologic Determination =

Secondary Indicator Score (if applicable) =

Justification / Notes : bermuda Poa

adjacent to ag field

This data form is representative WWC003.

Secondary Field Indicator Evaluation

A. **Geomorphology** (Subtotal =)	Absent	Weak	Moderate	Strong
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. **Hydrology** (Subtotal =)	Absent	Weak	Moderate	Strong
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in stream bed or sides of channel	No = 0		Yes = 1.5	

C. **Biology** (Subtotal =)	Absent	Weak	Moderate	Strong
20. Fibrous roots in channel [1]	3	2	1	0
21. Rooted plants in channel [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	0.5	1	1.5
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel [2]	0	0.5	1	2

[1] Focus is on the presence of upland plants. [2] Focus is on the presence of aquatic or wetland plants.

Total Points = _____

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.4 WWC Form 037

14WWC005

County: Fayette	Named Waterbody: NA	Date/Time: 1/14/19 1330
Assessors/Affiliation: Ryan Hammons, Tara Kent		Project ID: WWC005 DP20181113, WWC005 14WWS
Site Name/Description: Yum Yum Solar		
Site Location: 14WWS Yum Yum TN		
USGS quad: 035086bS	HUC (12 digit): 08010209	Lat/Long: NA
Previous Rainfall (7-days): 0.64"		
Precipitation this Season vs. Normal: very wet wet average dry drought unknown Source of recent & seasonal precip data:		
Watershed Size:	Photos: Y or N (circle) Number: See photo log	
Soil Type(s) / Geology: FU		Source: NRCS
Surrounding Land Use: Agriculture		
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes): Severe Moderate Slight Absent		

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	X	WWC
2. Defined bed and bank absent, dominated by upland vegetation / grass	X	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions		WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	NA	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	X	Stream
6. Presence of fish (except *Gambusia*)	X	Stream
7. Presence of naturally occurring ground water table connection	X	Stream
8. Flowing water in channel and 7 days since last precipitation in local watershed	X	Stream
9. Evidence watercourse has been used as a supply of drinking water	X	Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then STOP; absent directly contradictory evidence, determination is complete.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.4*

Overall Hydrologic Determination =

Secondary Indicator Score (if applicable) =

Justification / Notes: Sweet gum
J. honeysuckle

adjacent ag fields

This data form is representative of WWC027.

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal =)	Absent	Weak	Moderate	Strong
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal =)	Absent	Weak	Moderate	Strong
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in stream bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal =)	Absent	Weak	Moderate	Strong
20. Fibrous roots in channel [1]	3	2	1	0
21. Rooted plants in channel [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	0.5	1	1.5
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel [2]	0	0.5	1	2

[1] Focus is on the presence of upland plants. [2] Focus is on the presence of aquatic or wetland plants.

Total Points = _____

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.4 WWC Form 038

14WWC6

County: Fayette	Named Waterbody: NA	Date/Time: 1/14/19 1355
Assessors/Affiliation: Ryan Hammons, Tara Kent		Project ID: WWC006-1 14WWC6
Site Name/Description: 14WWC6 Yum Yum Solar		
Site Location: Yum Yum TN		
USGS quad: 03568665	HUC (12 digit): 08010209	Lat/Long: NA
Previous Rainfall (7-days): 0.64"		
Precipitation this Season vs. Normal: very wet wet average dry drought unknown		
Source of recent & seasonal precip data:		
Watershed Size:	Photos: Y or N (circle) Number: See photo log	
Soil Type(s) / Geology: NA		Source: NRCS
Surrounding Land Use: Agriculture		
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes): Severe Moderate Slight Absent		

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	X	WWC
2. Defined bed and bank absent, dominated by upland vegetation / grass		WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	NA	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	NA	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	X	Stream
6. Presence of fish (except *Gambusia*)	X	Stream
7. Presence of naturally occurring ground water table connection	X	Stream
8. Flowing water in channel and 7 days since last precipitation in local watershed	X	Stream
9. Evidence watercourse has been used as a supply of drinking water	X	Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then STOP; absent directly contradictory evidence, determination is complete.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.4*

Overall Hydrologic Determination =

Secondary Indicator Score (if applicable) =

Justification / Notes: J. grass brassica adj. ag field
solidago Poa sp
filamentous green algae

This data form is representative of WWC019.

Secondary Field Indicator Evaluation

A. **Geomorphology** (Subtotal =)	Absent	Weak	Moderate	Strong
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. **Hydrology** (Subtotal =)	Absent	Weak	Moderate	Strong
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in stream bed or sides of channel	No = 0		Yes = 1.5	

C. **Biology** (Subtotal =)	Absent	Weak	Moderate	Strong
20. Fibrous roots in channel [1]	3	2	1	0
21. Rooted plants in channel [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	0.5	1	1.5
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel [2]	0	0.5	1	2

[1] Focus is on the presence of upland plants. [2] Focus is on the presence of aquatic or wetland plants.

Total Points = _____

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.4 WWC Form 039

14WWC7

County: Fayette	Named Waterbody: NA	Date/Time: 1/4/19 1410
Assessors/Affiliation: Ryan Hammons, Tara Kent, HDR		Project ID: start 14WWC7 14WWC7
Site Name/Description: 14WWC7 Yum Yum Solar		
Site Location: Yum Yum TN		
USGS quad: 03508665	HUC (12 digit): 08010209	Lat/Long: 35.326589 -89.452504
Previous Rainfall (7-days): 0.64"		
Precipitation this Season vs. Normal: very wet wet average dry drought unknown Source of recent & seasonal precip data:		
Watershed Size:	Photos: (Y) or N (circle) Number: See photo log	
Soil Type(s) / Geology: LgC		Source: NRCS
Surrounding Land Use: Agriculture		
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes): Severe Moderate Slight Absent		

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	X	WWC
2. Defined bed and bank absent, dominated by upland vegetation / grass		WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	NA	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	NA	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	X	Stream
6. Presence of fish (except *Gambusia*)	X	Stream
7. Presence of naturally occurring ground water table connection	X	Stream
8. Flowing water in channel and 7 days since last precipitation in local watershed	X	Stream
9. Evidence watercourse has been used as a supply of drinking water	X	Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then STOP; absent directly contradictory evidence, determination is complete.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.4*

Overall Hydrologic Determination =

Secondary Indicator Score (if applicable) =

Justification / Notes:

adjacent ag

T. grass
soybean ?
Rumex
Poa
L. purpurum

large headcut, erosion
drains ag field

This data form is representative of WWC011, WWC12, WWC013.

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal =)	Absent	Weak	Moderate	Strong
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal =)	Absent	Weak	Moderate	Strong
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in stream bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal =)	Absent	Weak	Moderate	Strong
20. Fibrous roots in channel [1]	3	2	1	0
21. Rooted plants in channel [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	0.5	1	1.5
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel [2]	0	0.5	1	2

[1] Focus is on the presence of upland plants. [2] Focus is on the presence of aquatic or wetland plants.

Total Points = _____

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.4 WWC Form 040

County: Fayette	Named Waterbody: NA	Date/Time: 1-14-19 1525
Assessors/Affiliation: Ryan Hammons, Tara Kent HDR		Project ID: 14WWC8 good line 14WWC18
Site Name/Description: 14WWC8 Yum Yum Sub		
Site Location: Yum Yum TN		
USGS quad: 03508665	HUC (12 digit): 08010209	Lat/Long: 35.327533 -89.432978
Previous Rainfall (7-days): 0.64"		
Precipitation this Season vs. Normal: very wet wet average dry drought unknown Source of recent & seasonal precip data:		
Watershed Size:	Photos: Y or N (circle) Number: See photo log	
Soil Type(s) / Geology: NA		Source: NRCS
Surrounding Land Use: Agriculture		
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes): Severe Moderate Slight Absent		

14WWC8

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	X	WWC
2. Defined bed and bank absent, dominated by upland vegetation / grass		WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	NA	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	NA	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	X	Stream
6. Presence of fish (except *Gambusia*)	X	Stream
7. Presence of naturally occurring ground water table connection	X	Stream
8. Flowing water in channel and 7 days since last precipitation in local watershed	X	Stream
9. Evidence watercourse has been used as a supply of drinking water	X	Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then STOP; absent directly contradictory evidence, determination is complete.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.4*

Overall Hydrologic Determination =

Secondary Indicator Score (if applicable) =

Justification / Notes: Sycamore, SW gum, J. grass, Sphagnum, rosette forbs; Wooded area, ag cotton adjacent

This data form is representative of WWC023 and WWC024.

Secondary Field Indicator Evaluation

A. **Geomorphology** (Subtotal =)	Absent	Weak	Moderate	Strong
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. **Hydrology** (Subtotal =)	Absent	Weak	Moderate	Strong
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in stream bed or sides of channel	No = 0		Yes = 1.5	

C. **Biology** (Subtotal =)	Absent	Weak	Moderate	Strong
20. Fibrous roots in channel [1]	3	2	1	0
21. Rooted plants in channel [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	0.5	1	1.5
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel [2]	0	0.5	1	2

[1] Focus is on the presence of upland plants. [2] Focus is on the presence of aquatic or wetland plants.

Total Points = _____

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.4 WWC Form 041

County: Fayette	Named Waterbody: NA	Date/Time: 1-14-19 1535
Assessors/Affiliation: Ryan Hammons, Tara Kent, HDR		Project ID: 14WWC9
Site Name/Description: 14WWC9 Yum Yum Solar		Yum Yum Solar
Site Location: Yum Yum TN		
USGS quad: 03508261	HUC (12 digit): 08010209	Lat/Long: 35.329507 -89.433341
Previous Rainfall (7-days): 0.64"		
Precipitation this Season vs. Normal: very wet **wet** average dry drought unknown Source of recent & seasonal precip data:		
Watershed Size:	Photos: **Y** or N (circle) Number: See photo log	
Soil Type(s) / Geology: Fm		Source: NRCS
Surrounding Land Use: Agriculture		
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes): **Severe** Moderate Slight Absent		

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	X	WWC
2. Defined bed and bank absent, dominated by upland vegetation / grass		**WWC**
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	NA	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	NA	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	X	Stream
6. Presence of fish (except *Gambusia*)	X	Stream
7. Presence of naturally occurring ground water table connection	X	Stream
8. Flowing water in channel and 7 days since last precipitation in local watershed	X	Stream
9. Evidence watercourse has been used as a supply of drinking water	X	Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then STOP; absent directly contradictory evidence, determination is complete.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.4*

Overall Hydrologic Determination =

Secondary Indicator Score (if applicable) =

Justification / Notes: drainage canal in cotton field flows SW

Poa sp.
T. grass
Solanaceae
sedge

This data form is representative of WWC017 and WWC018.

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal =)	Absent	Weak	Moderate	Strong
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal =)	Absent	Weak	Moderate	Strong
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in stream bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal =)	Absent	Weak	Moderate	Strong
20. Fibrous roots in channel [1]	3	2	1	0
21. Rooted plants in channel [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	0.5	1	1.5
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel [2]	0	0.5	1	2

[1] Focus is on the presence of upland plants. [2] Focus is on the presence of aquatic or wetland plants.

Total Points = _____

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.4 WWC Form 043

County: Fayette	Named Waterbody: NA	Date/Time: 1-15-19 1038
Assessors/Affiliation: Ryan Hammons, Tara Kent HDR		Project ID : 1SWWC2
Site Name/Description: Yum Yum Solar		
Site Location: 1SWWC2 Yum Yum, TN		
USGS quad: 03508665	HUC (12 digit): 08010204	Lat/Long: 35.336419 -89.400507
Previous Rainfall (7-days) : 0.64"		
Precipitation this Season vs. Normal : very wet / wet average dry drought unknown Source of recent & seasonal precip data :		
Watershed Size :	Photos: Y or N (circle) Number : See photo log	
Soil Type(s) / Geology : Fm		Source: NRCS
Surrounding Land Use : Agricultural		
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe Moderate Slight Absent		

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	X	WWC
2. Defined bed and bank absent, dominated by upland vegetation / grass	X	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions		WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	NA	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	X	Stream
6. Presence of fish (except *Gambusia*)	X	Stream
7. Presence of naturally occurring ground water table connection	X	Stream
8. Flowing water in channel and 7 days since last precipitation in local watershed	X	Stream
9. Evidence watercourse has been used as a supply of drinking water	X	Stream

NOTE : If any Primary Indicators 1-9 = "Yes", then STOP; absent directly contradictory evidence, determination is complete.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.4*

Overall Hydrologic Determination =

Secondary Indicator Score (if applicable) =

Justification / Notes : Rumex, Johnsongrass, Giant Ragweed, Cetana, bermudagrass, red & purple top panicum

4' OHWM

drainage adj. to ceg / corn field

This data form is representative of WWC052, and WWC053.

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal =)	Absent	Weak	Moderate	Strong
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal =)	Absent	Weak	Moderate	Strong
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in stream bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal =)	Absent	Weak	Moderate	Strong
20. Fibrous roots in channel [1]	3	2	1	0
21. Rooted plants in channel [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	0.5	1	1.5
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel [2]	0	0.5	1	2

[1] Focus is on the presence of upland plants. [2] Focus is on the presence of aquatic or wetland plants.

Total Points = _____

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.4 WWC Form 044

15WWC3

County: Fayette	Named Waterbody: NA	Date/Time: 15JAN19 1125
Assessors/Affiliation: Ryan Hemmons, Tara Kent		Project ID: 15WWC3 YYR2
Site Name/Description: Yum Yum Solar		
Site Location: 15WWC3 Yum Yum, TN		
USGS quad: 035086bS	HUC (12 digit): 08010209	Lat/Long: 35.337753 -89.343416
Previous Rainfall (7-days): 0.64"		
Precipitation this Season vs. Normal: very wet **wet** average dry drought unknown Source of recent & seasonal precip data:		
Watershed Size:	Photos: Y or N (circle) Number: See photo log	
Soil Type(s) / Geology: LaC3		Source: NRCS
Surrounding Land Use: Agricultural		
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes): **Severe** Moderate Slight Absent		

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	X	WWC
2. Defined bed and bank absent, dominated by upland vegetation / grass	X	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions		WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	NA	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	X	Stream
6. Presence of fish (except *Gambusia*)	X	Stream
7. Presence of naturally occurring ground water table connection	X	Stream
8. Flowing water in channel and 7 days since last precipitation in local watershed	X	Stream
9. Evidence watercourse has been used as a supply of drinking water	X	Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then STOP; absent directly contradictory evidence, determination is complete.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.4*

Overall Hydrologic Determination =

Secondary Indicator Score (if applicable) =

Justification / Notes: Privet sweetgum elm, oak edgac. to cotton field

This data form is representative for WWC007, WWC075, WWC076, WWC077, WWC078, WWC079, WWC080, WWC081, WWC082, WWC083, WWC084, WWC085, WWC086, WWC087, WWC088, WWC089, WWC090, WWC091, WWC092, and WWC093.

Secondary Field Indicator Evaluation

A. **Geomorphology** (Subtotal =)	Absent	Weak	Moderate	Strong
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. **Hydrology** (Subtotal =)	Absent	Weak	Moderate	Strong
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in stream bed or sides of channel	No = 0		Yes = 1.5	

C. **Biology** (Subtotal =)	Absent	Weak	Moderate	Strong
20. Fibrous roots in channel [1]	3	2	1	0
21. Rooted plants in channel [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain) [1]	0	0.5	1	1.5
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel [2]	0	0.5	1	2

[1] Focus is on the presence of upland plants. [2] Focus is on the presence of aquatic or wetland plants.

Total Points = _____

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.4 WWC Form 045

County: Fayette	Named Waterbody: NA	Date/Time: 15 JAN 19 1207
Assessors/Affiliation: Ryan Hammons, Tara Kent		Project ID : 15WWC04
Site Name/Description: Yum Yum Solar		
Site Location: 15WWC04 Yum Yum TN		
USGS quad: 035086b5	HUC (12 digit): 08010209	Lat/Long: NA
Previous Rainfall (7-days) : 0.64"		
Precipitation this Season vs. Normal : very wet X wet average dry drought unknown Source of recent & seasonal precip data :		
Watershed Size :	Photos: Y or N (circle) Number : See photo log	
Soil Type(s) / Geology : NA		Source:
Surrounding Land Use : Agricultural		
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe X Moderate Slight Absent		

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	X	WWC
2. Defined bed and bank absent, dominated by upland vegetation / grass	X	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions		WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	NA	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	X	Stream
6. Presence of fish (except *Gambusia*)	X	Stream
7. Presence of naturally occurring ground water table connection	X	Stream
8. Flowing water in channel and 7 days since last precipitation in local watershed	X	Stream
9. Evidence watercourse has been used as a supply of drinking water	X	Stream

NOTE : If any Primary Indicators 1-9 = "Yes", then STOP; absent directly contradictory evidence, determination is complete.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.4*

Overall Hydrologic Determination =

Secondary Indicator Score (if applicable) =

Justification / Notes : adj to ag field

chives
Privet vine
oak
winged elm
nutsedge

This data form is representative for WWC071.

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal =)	Absent	Weak	Moderate	Strong
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal =)	Absent	Weak	Moderate	Strong
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in stream bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal =)	Absent	Weak	Moderate	Strong
20. Fibrous roots in channel [1]	3	2	1	0
21. Rooted plants in channel [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	0.5	1	1.5
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28. Wetland plants in channel [2]	0	0.5	1	2

[1] Focus is on the presence of upland plants. [2] Focus is on the presence of aquatic or wetland plants.

Total Points = _____

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.4 WWC Form 046

County: Fayette	Named Waterbody: NA	Date/Time: 1-15-19 1325
Assessors/Affiliation: Ryan Hammons, Tara Kent HDR		Project ID : 1SWWC5
Site Name/Description: Yum Yum Solar		
Site Location: 15WWC5 Yum Yum TN		
USGS quad: 035086b5	HUC (12 digit): 08010209	Lat/Long: 35.333693 -89.381524
Previous Rainfall (7-days) : 0.64"		
Precipitation this Season vs. Normal : very wet wet average dry drought unknown Source of recent & seasonal precip data :		
Watershed Size :	Photos: Y or N (circle) Number : See photo log	
Soil Type(s) / Geology : Fu		Source: NRCS
Surrounding Land Use : Agriculture		
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe Moderate Slight Absent		

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	X	WWC
2. Defined bed and bank absent, dominated by upland vegetation / grass		WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	NA	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	NA	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	X	Stream
6. Presence of fish (except *Gambusia*)	X	Stream
7. Presence of naturally occurring ground water table connection	X	Stream
8. Flowing water in channel and 7 days since last precipitation in local watershed	X	Stream
9. Evidence watercourse has been used as a supply of drinking water	X	Stream

NOTE : If any Primary Indicators 1-9 = "Yes", then STOP; absent directly contradictory evidence, determination is complete.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.4*

Overall Hydrologic Determination =

Secondary Indicator Score (if applicable) =

Justification / Notes : drainage in ag field cotton

This data form is representative for WWC071.

Secondary Field Indicator Evaluation

A. **Geomorphology** (Subtotal =)	Absent	Weak	Moderate	Strong
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. **Hydrology** (Subtotal =)	Absent	Weak	Moderate	Strong
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in stream bed or sides of channel	No = 0		Yes = 1.5	

C. **Biology** (Subtotal =)	Absent	Weak	Moderate	Strong
20. Fibrous roots in channel [1]	3	2	1	0
21. Rooted plants in channel [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	0.5	1	1.5
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel [2]	0	0.5	1	2

[1] Focus is on the presence of upland plants. [2] Focus is on the presence of aquatic or wetland plants.

Total Points = _____

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.4 WWC Form 047

County: Fayette	Named Waterbody: NA	Date/Time: 1-15-19 1334
Assessors/Affiliation: Ryen Hammons, Tara Kent		Project ID : 15WWC6
Site Name/Description: Yum Yum Solar		
Site Location: 15WWC6 Yum Yum, TN		
USGS quad: 03508665	HUC (12 digit): 08010209	Lat/Long: 35.331769 -89.388879
Previous Rainfall (7-days) : 0.64"		
Precipitation this Season vs. Normal : very wet wet average dry drought unknown Source of recent & seasonal precip data :		
Watershed Size :	Photos: Y or N (circle) Number : See photo log	
Soil Type(s) / Geology : Fm		Source: NRCS
Surrounding Land Use : Agriculture		
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe Moderate Slight Absent		

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	X	WWC
2. Defined bed and bank absent, dominated by upland vegetation / grass		WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	NA	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	NA	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	X	Stream
6. Presence of fish (except *Gambusia*)	X	Stream
7. Presence of naturally occurring ground water table connection	X	Stream
8. Flowing water in channel and 7 days since last precipitation in local watershed	X	Stream
9. Evidence watercourse has been used as a supply of drinking water	X	Stream

NOTE : If any Primary Indicators 1-9 = "Yes", then STOP; absent directly contradictory evidence, determination is complete.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.4*

Overall Hydrologic Determination =

Secondary Indicator Score (if applicable) =

Justification / Notes : draining ag field
lots of concrete brick riprap to address erosion

Johnsongrass
Staghorn sumac

This data form is representative of WWC068.

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal =)	Absent	Weak	Moderate	Strong
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal =)	Absent	Weak	Moderate	Strong
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in stream bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal =)	Absent	Weak	Moderate	Strong
20. Fibrous roots in channel [1]	3	2	1	0
21. Rooted plants in channel [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	0.5	1	1.5
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel [2]	0	0.5	1	2

[1] Focus is on the presence of upland plants. [2] Focus is on the presence of aquatic or wetland plants.

Total Points = _____

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.4 WWC Form 048

County: Fayette	Named Waterbody: NA	Date/Time: 1-15-19
Assessors/Affiliation: Ryan Hammons, Tara Kent		Project ID : 1SWWC7
Site Name/Description: Yum Yum Solar		
Site Location: 15WWC7 Yum Yum, TN		
USGS quad: 03508665	HUC (12 digit): 080102091	Lat/Long: 35.328924 -89.336255
Previous Rainfall (7-days) : 0.64"		
Precipitation this Season vs. Normal : very wet X wet average dry drought unknown Source of recent & seasonal precip data :		
Watershed Size :	Photos: Y or N (circle) Number : See photo log	
Soil Type(s) / Geology : GbB2		Source: NRCS
Surrounding Land Use : ag land		
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe Moderate Slight Absent		

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	X	WWC
2. Defined bed and bank absent, dominated by upland vegetation / grass		WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	NA	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	NA	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	X	Stream
6. Presence of fish (except *Gambusia*)	X	Stream
7. Presence of naturally occurring ground water table connection	X	Stream
8. Flowing water in channel and 7 days since last precipitation in local watershed	X	Stream
9. Evidence watercourse has been used as a supply of drinking water	X	Stream

NOTE : If any Primary Indicators 1-9 = "Yes", then STOP; absent directly contradictory evidence, determination is complete.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.4*

Overall Hydrologic Determination =

Secondary Indicator Score (if applicable) =

Justification / Notes : adjent cotton field

Johnsongrass
bermuda grass

This data form is representative for WWC055, WWC057, WWC069.

Secondary Field Indicator Evaluation

A. **Geomorphology** (Subtotal =)	Absent	Weak	Moderate	Strong
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. **Hydrology** (Subtotal =)	Absent	Weak	Moderate	Strong
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in stream bed or sides of channel	No = 0		Yes = 1.5	

C. **Biology** (Subtotal =)	Absent	Weak	Moderate	Strong
20. Fibrous roots in channel [1]	3	2	1	0
21. Rooted plants in channel [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	0.5	1	1.5
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel [2]	0	0.5	1	2

[1] Focus is on the presence of upland plants. [2] Focus is on the presence of aquatic or wetland plants.

Total Points = _____

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.4 WWC Form 049

County: Fayette	Named Waterbody: NA	Date/Time: 1-15-19 1430
Assessors/Affiliation: Ryan Hammons, Tara Kent		Project ID : 15WWC8
Site Name/Description: Yum Yum Solar		
Site Location: 15WWC 8 Yum Yum, TN		
USGS quad: 0350865	HUC (12 digit): 08010209	Lat/Long: 35.330293 -89.391001
Previous Rainfall (7-days) : 0.64"		
Precipitation this Season vs. Normal : very wet wet average dry drought unknown Source of recent & seasonal precip data :		
Watershed Size :	Photos: Y or N (circle) Number : See photo log	
Soil Type(s) / Geology : GaB3		Source: NRCS
Surrounding Land Use : Agriculture		
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe Moderate Slight Absent		

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	X	WWC
2. Defined bed and bank absent, dominated by upland vegetation / grass		WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	NA	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	NA	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	X	Stream
6. Presence of fish (except *Gambusia*)	X	Stream
7. Presence of naturally occurring ground water table connection	X	Stream
8. Flowing water in channel and 7 days since last precipitation in local watershed	X	Stream
9. Evidence watercourse has been used as a supply of drinking water	X	Stream

NOTE : If any Primary Indicators 1-9 = "Yes", then STOP; absent directly contradictory evidence, determination is complete.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.4*

Overall Hydrologic Determination =

Secondary Indicator Score (if applicable) =

Justification / Notes : Convevence along a manmade berm in corn ag field

Johnson grass
Lamium purpura
Poa

This data form is representative for WWC054, and WWC067.

Secondary Field Indicator Evaluation

A. **Geomorphology** (Subtotal =)	Absent	Weak	Moderate	Strong
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. **Hydrology** (Subtotal =)	Absent	Weak	Moderate	Strong
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in stream bed or sides of channel	No = 0		Yes = 1.5	

C. **Biology** (Subtotal =)	Absent	Weak	Moderate	Strong
20. Fibrous roots in channel [1]	3	2	1	0
21. Rooted plants in channel [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	0.5	1	1.5
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel [2]	0	0.5	1	2

[1] Focus is on the presence of upland plants. [2] Focus is on the presence of aquatic or wetland plants.

Total Points = _____

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.4 WWC Form 050

County: Fayette	Named Waterbody: NA	Date/Time: 1/15/19 1452
Assessors/Affiliation: Ryan Hammons, Tara Kent		Project ID: 15WWC9
Site Name/Description: Yum Yum Solar		
Site Location: 15WWC9 Yum Yum TN		
USGS quad: 035086b5	HUC (12 digit): 08010204	Lat/Long: NA
Previous Rainfall (7-days): 0.64"		
Precipitation this Season vs. Normal: very wet **wet** average dry drought unknown Source of recent & seasonal precip data:		
Watershed Size:	Photos: Y or N (circle) Number: See photo log	
Soil Type(s) / Geology: NA		Source:
Surrounding Land Use: Agriculture		
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes): **Severe** Moderate Slight Absent		

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	X	WWC
2. Defined bed and bank absent, dominated by upland vegetation / grass		WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	NA	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	NA	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	X	Stream
6. Presence of fish (except *Gambusia*)	X	Stream
7. Presence of naturally occurring ground water table connection	X	Stream
8. Flowing water in channel and 7 days since last precipitation in local watershed	X	Stream
9. Evidence watercourse has been used as a supply of drinking water	X	Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then STOP; absent directly contradictory evidence, determination is complete.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.4*

Overall Hydrologic Determination =

Secondary Indicator Score (if applicable) =

Justification / Notes: manmade berm convey to stream flows during very high events

Corn/fallow field

Other field to the west flows to this one

L. perpenna

Poa sp (short)

Rumex

Senecio sp? (weed)

This data form is representative for WWC067.

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal =)	Absent	Weak	Moderate	Strong
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal =)	Absent	Weak	Moderate	Strong
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in stream bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal =)	Absent	Weak	Moderate	Strong
20. Fibrous roots in channel [1]	3	2	1	0
21. Rooted plants in channel [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	0.5	1	1.5
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel [2]	0	0.5	1	2

[1] Focus is on the presence of upland plants. [2] Focus is on the presence of aquatic or wetland plants.

Total Points = _____

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.4 WWC Form 051

County: Fayette	Named Waterbody: NA	Date/Time: 1-16-19 1112
Assessors/Affiliation: RH TK Ryan Hammons, Tara Kent HDR		Project ID: 16WWC1
Site Name/Description: Yum Yum, Solar		
Site Location: 16WWC1 Yum Yum, TN		
USGS quad: 03508665	HUC (12 digit): 08010209	Lat/Long: 35.309832 -89.390596
Previous Rainfall (7-days): 0.64"		
Precipitation this Season vs. Normal: very wet wet average dry drought unknown Source of recent & seasonal precip data:		
Watershed Size:	Photos: Y or N (circle) Number: See photo log	
Soil Type(s) / Geology: He		Source: NRCS
Surrounding Land Use: Agriculture		
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes): Severe Moderate Slight Absent		

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	X	WWC
2. Defined bed and bank absent, dominated by upland vegetation / grass	X	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions		WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	NA	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	NA	Stream
6. Presence of fish (except *Gambusia*)	X	Stream
7. Presence of naturally occurring ground water table connection	X	Stream
8. Flowing water in channel and 7 days since last precipitation in local watershed	X	Stream
9. Evidence watercourse has been used as a supply of drinking water	X	Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then STOP; absent directly contradictory evidence, determination is complete.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.4*

Overall Hydrologic Determination =

Secondary Indicator Score (if applicable) =

Justification / Notes: Paspalum short drainage adj. to ag field, fallow cotton
privet
Lamium purpureum filam. green algae in channel
trumpet creeper
giant Solidago not moving & stagnent
Verbasum thapsus
Staghorn sumac

This data form is representative for WWC064.

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal =)	Absent	Weak	Moderate	Strong
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal =)	Absent	Weak	Moderate	Strong
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in stream bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal =)	Absent	Weak	Moderate	Strong
20. Fibrous roots in channel [1]	3	2	1	0
21. Rooted plants in channel [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	0.5	1	1.5
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel [2]	0	0.5	1	2

[1] Focus is on the presence of upland plants. [2] Focus is on the presence of aquatic or wetland plants.

Total Points = _____

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.4 WWC Form 052

County: Fayette	Named Waterbody: NA	Date/Time: 1-16-19 1128
Assessors/Affiliation: RH TK Ryan Hammons, Tara Kent		Project ID : 16WWC2
Site Name/Description: Yum Yum Solar		
Site Location: 16 WWC 2 Yum Yum, TN		
USGS quad: 03508655	HUC (12 digit): 08010209	Lat/Long: 35.307732 -89.390799
Previous Rainfall (7-days) : 0.64"		
Precipitation this Season vs. Normal : very wet wet average dry drought unknown Source of recent & seasonal precip data :		
Watershed Size :	Photos: (Y) or N (circle) Number : See photo log	
Soil Type(s) / Geology : He		Source: NRCS
Surrounding Land Use : Agriculture		
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : (Severe) Moderate Slight Absent		

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	X	WWC
2. Defined bed and bank absent, dominated by upland vegetation / grass	X	(WWC)
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions		(WWC)
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	NA	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	X	Stream
6. Presence of fish (except *Gambusia*)	X	Stream
7. Presence of naturally occurring ground water table connection	X	Stream
8. Flowing water in channel and 7 days since last precipitation in local watershed	X	Stream
9. Evidence watercourse has been used as a supply of drinking water	X	Stream

NOTE : If any Primary Indicators 1-9 = "Yes", then STOP; absent directly contradictory evidence, determination is complete.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.4*

Overall Hydrologic Determination =

Secondary Indicator Score (if applicable) =

Justification / Notes : ~~ad~~ drainage along manmade berm in fallow cotton field

This data form is representative of WWC066.

Secondary Field Indicator Evaluation

A. **Geomorphology** (Subtotal =)	Absent	Weak	Moderate	Strong
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. **Hydrology** (Subtotal =)	Absent	Weak	Moderate	Strong
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in stream bed or sides of channel	No = 0		Yes = 1.5	

C. **Biology** (Subtotal =)	Absent	Weak	Moderate	Strong
20. Fibrous roots in channel [1]	3	2	1	0
21. Rooted plants in channel [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	0.5	1	1.5
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel [2]	0	0.5	1	2

[1] Focus is on the presence of upland plants. [2] Focus is on the presence of aquatic or wetland plants.

Total Points = _____

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.4 WWC Form 053

County: Fayette	Named Waterbody: NA	Date/Time: 1-16-19 1131
Assessors/Affiliation: RH TK Ryan Hammons Tara Kent		Project ID : 16WWC3
Site Name/Description: Yum Yum Solar		
Site Location: 16 WWC 3 Yum Yum, TN		
USGS quad: 03508655	HUC (12 digit): 08010209	Lat/Long: 35.308182 -89.384412
Previous Rainfall (7-days) : 0.64"		
Precipitation this Season vs. Normal : very wet wet average dry drought unknown Source of recent & seasonal precip data :		
Watershed Size :	Photos: Y or N (circle) Number : See photo log	
Soil Type(s) / Geology : HC		Source: NRCS
Surrounding Land Use : Agricultural		
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe Moderate Slight Absent		

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	X	WWC
2. Defined bed and bank absent, dominated by upland vegetation / grass		WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions		WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall		WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase		Stream
6. Presence of fish (except *Gambusia*)		Stream
7. Presence of naturally occurring ground water table connection		Stream
8. Flowing water in channel and 7 days since last precipitation in local watershed		Stream
9. Evidence watercourse has been used as a supply of drinking water		Stream

NOTE : If any Primary Indicators 1-9 = "Yes", then STOP; absent directly contradictory evidence, determination is complete.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.4*

Overall Hydrologic Determination =

Secondary Indicator Score (if applicable) =

Justification / Notes :

drainage in fallow cotton field

Poa sp (short one)
L. purpurum (henbit)
lousewort ?

This data form is representative of WWC065.

Secondary Field Indicator Evaluation

A. **Geomorphology** (Subtotal =)	Absent	Weak	Moderate	Strong
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. **Hydrology** (Subtotal =)	Absent	Weak	Moderate	Strong
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in stream bed or sides of channel	No = 0		Yes = 1.5	

C. **Biology** (Subtotal =)	Absent	Weak	Moderate	Strong
20. Fibrous roots in channel [1]	3	2	1	0
21. Rooted plants in channel [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	0.5	1	1.5
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel [2]	0	0.5	1	2

[1] Focus is on the presence of upland plants. [2] Focus is on the presence of aquatic or wetland plants.

Total Points = _____

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.4 WWC Form 054

County: Fayette	Named Waterbody: NA	Date/Time: 1-16-19 1145
Assessors/Affiliation: Ryan Hammons Tara Kent		Project ID : 16WWC4
Site Name/Description: Yum Yum Solar		
Site Location: 16WWC4 Yum Yum, TN		
USGS quad: 03508655	HUC (12 digit): 08010209	Lat/Long: NA
Previous Rainfall (7-days) : 0.64"		
Precipitation this Season vs. Normal : very wet wet average dry drought unknown Source of recent & seasonal precip data :		
Watershed Size :	Photos: Y or N (circle) Number : See photo log	
Soil Type(s) / Geology : NA		Source: NRCS WSS
Surrounding Land Use : Agricultural		
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe Moderate Slight Absent		

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	X	WWC
2. Defined bed and bank absent, dominated by upland vegetation / grass	X	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions		WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall		WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase		Stream
6. Presence of fish (except *Gambusia*)		Stream
7. Presence of naturally occurring ground water table connection		Stream
8. Flowing water in channel and 7 days since last precipitation in local watershed		Stream
9. Evidence watercourse has been used as a supply of drinking water		Stream

NOTE : If any Primary Indicators 1-9 = "Yes", then STOP; absent directly contradictory evidence, determination is complete.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.4*

Overall Hydrologic Determination =

Secondary Indicator Score (if applicable) =

Justification / Notes : in ag field

This data form is representative for WWC063.

Secondary Field Indicator Evaluation

A. **Geomorphology** (Subtotal =)	Absent	Weak	Moderate	Strong
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. **Hydrology** (Subtotal =)	Absent	Weak	Moderate	Strong
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in stream bed or sides of channel	No = 0		Yes = 1.5	

C. **Biology** (Subtotal =)	Absent	Weak	Moderate	Strong
20. Fibrous roots in channel [1]	3	2	1	0
21. Rooted plants in channel [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	0.5	1	1.5
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel [2]	0	0.5	1	2

[1] Focus is on the presence of upland plants. [2] Focus is on the presence of aquatic or wetland plants.

Total Points = _____

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.4WWC Form 055

County: Fayette	Named Waterbody: NA	Date/Time: 1-16-19 1244
Assessors/Affiliation: Ryan Hammons, Tara Kent ADR		Project ID : 16WWC5
Site Name/Description: 16 WWC 5 Yum Yum Solar		
Site Location: Yum Yum, TN		
USGS quad: 03508665	HUC (12 digit): 08010209	Lat/Long: NA
Previous Rainfall (7-days) : 0.64"		
Precipitation this Season vs. Normal : very wet wet average dry drought unknown Source of recent & seasonal precip data :		
Watershed Size :	Photos: Y or N (circle) Number : See photo log	
Soil Type(s) / Geology : NA		Source: NRCS WSS
Surrounding Land Use : Agricultural		
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe Moderate Slight Absent		

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	X	WWC
2. Defined bed and bank absent, dominated by upland vegetation / grass	X	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions		WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall		WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase		Stream
6. Presence of fish (except *Gambusia*)		Stream
7. Presence of naturally occurring ground water table connection		Stream
8. Flowing water in channel and 7 days since last precipitation in local watershed		Stream
9. Evidence watercourse has been used as a supply of drinking water		Stream

NOTE : If any Primary Indicators 1-9 = "Yes", then STOP; absent directly contradictory evidence, determination is complete.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.4*

Overall Hydrologic Determination =

Secondary Indicator Score (if applicable) =

Justification / Notes : J. gravel

headcut/erosion starts in ag field
flowed directly to stream

This data form is representative of WWC062.

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal =)	Absent	Weak	Moderate	Strong
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal =)	Absent	Weak	Moderate	Strong
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in stream bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal =)	Absent	Weak	Moderate	Strong
20. Fibrous roots in channel [1]	3	2	1	0
21. Rooted plants in channel [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	0.5	1	1.5
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel [2]	0	0.5	1	2

[1] Focus is on the presence of upland plants. [2] Focus is on the presence of aquatic or wetland plants.

Total Points = _____

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.4 WWC Form 056

County: Fayette	Named Waterbody: NA	Date/Time: 1-16-19 1304
Assessors/Affiliation: Ryan Hammons, Tara Kent HDR		Project ID : 16WWC7
Site Name/Description: 16 WWC 7		
Site Location: Yum Yum, TN		
USGS quad: 03508655	HUC (12 digit): 08010209	Lat/Long: 35.30342 -89.346253
Previous Rainfall (7-days) : 0.64"		
Precipitation this Season vs. Normal : very wet wet average dry drought unknown Source of recent & seasonal precip data :		
Watershed Size :	Photos: Y or N (circle) Number : See photo log	
Soil Type(s) / Geology : FU		Source: NRCS WSS
Surrounding Land Use : ag / cotton / woods		
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe X Moderate Slight Absent		

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	X	WWC
2. Defined bed and bank absent, dominated by upland vegetation / grass	X	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions		WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall		WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase		Stream
6. Presence of fish (except *Gambusia*)		Stream
7. Presence of naturally occurring ground water table connection		Stream
8. Flowing water in channel and 7 days since last precipitation in local watershed		Stream
9. Evidence watercourse has been used as a supply of drinking water		Stream

NOTE : If any Primary Indicators 1-9 = "Yes", then STOP; absent directly contradictory evidence, determination is complete.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.4*

Overall Hydrologic Determination =

Secondary Indicator Score (if applicable) =

Justification / Notes : drainage from field

Smilax
hickory
sweet gum
J. effusus
nutsedge

This data form is representative of WWC056.

Secondary Field Indicator Evaluation

A. **Geomorphology** (Subtotal =)	Absent	Weak	Moderate	Strong
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. **Hydrology** (Subtotal =)	Absent	Weak	Moderate	Strong
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in stream bed or sides of channel	No = 0		Yes = 1.5	

C. **Biology** (Subtotal =)	Absent	Weak	Moderate	Strong
20. Fibrous roots in channel [1]	3	2	1	0
21. Rooted plants in channel [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	0.5	1	1.5
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel [2]	0	0.5	1	2

[1] Focus is on the presence of upland plants. [2] Focus is on the presence of aquatic or wetland plants.

Total Points = _____

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.4 WWC Form 057

County: Fayette	Named Waterbody: NA	Date/Time: 1-16-19
Assessors/Affiliation: Ryan Hammons Tara Kent, HDR		Project ID : 16WWC8
Site Name/Description: Yum Yum Solar		
Site Location: 16 WWC 8 Yum Yum, TN		
USGS quad: 03508665	HUC (12 digit): 08010201	Lat/Long: 35.368524 -89.396746
Previous Rainfall (7-days) : 0.64"		
Precipitation this Season vs. Normal : very wet wet average dry drought unknown Source of recent & seasonal precip data :		
Watershed Size :	Photos: Y or N (circle) Number : See photo log	
Soil Type(s) / Geology : Hc		Source: NRCS WSS
Surrounding Land Use : Agricultural		
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe Moderate Slight Absent		

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	X	WWC
2. Defined bed and bank absent, dominated by upland vegetation / grass	X	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions		WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall		WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase		Stream
6. Presence of fish (except *Gambusia*)		Stream
7. Presence of naturally occurring ground water table connection		Stream
8. Flowing water in channel and 7 days since last precipitation in local watershed		Stream
9. Evidence watercourse has been used as a supply of drinking water		Stream

NOTE : If any Primary Indicators 1-9 = "Yes", then STOP; absent directly contradictory evidence, determination is complete.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.4*

Overall Hydrologic Determination =

Secondary Indicator Score (if applicable) =

Justification / Notes : drainage in cotton field
fil. green algae (where stream starts)
Poa sp.
Cotton
louse wort
Lamium purpureum
brassica
tansy ragwort ?

This data form is representative of WWC062.

Secondary Field Indicator Evaluation

A. **Geomorphology** (Subtotal =)	Absent	Weak	Moderate	Strong
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. **Hydrology** (Subtotal =)	Absent	Weak	Moderate	Strong
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in stream bed or sides of channel	No = 0		Yes = 1.5	

C. **Biology** (Subtotal =)	Absent	Weak	Moderate	Strong
20. Fibrous roots in channel [1]	3	2	1	0
21. Rooted plants in channel [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	0.5	1	1.5
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel [2]	0	0.5	1	2

[1] Focus is on the presence of upland plants. [2] Focus is on the presence of aquatic or wetland plants.

Total Points = _____

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.4 WWC Form 069

County: Fayette	Named Waterbody: NA	Date/Time: 1-17-19 1054
Assessors/Affiliation: Ryan Hammons, Tera Kent HDR		Project ID : 17WWC1
Site Name/Description: Yum Yum Solar		
Site Location: Yum Yum, TN		
USGS quad: 03508655	HUC (12 digit): 08010209	Lat/Long: 35.314402 -89.420417
Previous Rainfall (7-days) : yes, last night 0.64"		
Precipitation this Season vs. Normal : very wet wet average dry drought unknown Source of recent & seasonal precip data :		
Watershed Size :	Photos: Y or N (circle) Number : See photo log	
Soil Type(s) / Geology : Ho		Source: WSS
Surrounding Land Use : agricultural		
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe Moderate Slight Absent		

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	X	WWC
2. Defined bed and bank absent, dominated by upland vegetation / grass		WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions		WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall		WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase		Stream
6. Presence of fish (except *Gambusia*)		Stream
7. Presence of naturally occurring ground water table connection		Stream
8. Flowing water in channel and 7 days since last precipitation in local watershed		Stream
9. Evidence watercourse has been used as a supply of drinking water		Stream

NOTE : If any Primary Indicators 1-9 = "Yes", then STOP; absent directly contradictory evidence, determination is complete.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.4*

Overall Hydrologic Determination =

Secondary Indicator Score (if applicable) =

Justification / Notes : adjacent & draining perennial hay field

toeslope of field

plantago sp

sweet gum solidago

poa sp oak

crabgrass

This data form is representative of WWC039, WWC040, WWC041, WWC042.

Secondary Field Indicator Evaluation

A. **Geomorphology** (Subtotal =)	Absent	Weak	Moderate	Strong
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. **Hydrology** (Subtotal =)	Absent	Weak	Moderate	Strong
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in stream bed or sides of channel	No = 0		Yes = 1.5	

C. **Biology** (Subtotal =)	Absent	Weak	Moderate	Strong
20. Fibrous roots in channel [1]	3	2	1	0
21. Rooted plants in channel [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	0.5	1	1.5
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel [2]	0	0.5	1	2

[1] Focus is on the presence of upland plants. [2] Focus is on the presence of aquatic or wetland plants.

Total Points = _____

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.4 WWC Form 72

County: Fayette	Named Waterbody: NA	Date/Time: 1-17-19 1128
Assessors/Affiliation: Ryan Hammons, Tara Kent HDR		Project ID : 17WW6
Site Name/Description: Yum Yum Solar		
Site Location: Yum Yum, TN		
USGS quad: 03508665	HUC (12 digit): 08020109	Lat/Long: NA
Previous Rainfall (7-days) : 0.64"		
Precipitation this Season vs. Normal : very wet wet average dry drought unknown		
Source of recent & seasonal precip data :		
Watershed Size :	Photos: Y or N (circle) Number : See photo log	
Soil Type(s) / Geology : NA	Source: NRCS	
Surrounding Land Use : ag & woods		
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe Moderate Slight Absent		

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	X	WWC
2. Defined bed and bank absent, dominated by upland vegetation / grass		~~WWC~~
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions		WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall		WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase		Stream
6. Presence of fish (except *Gambusia*)		Stream
7. Presence of naturally occurring ground water table connection		Stream
8. Flowing water in channel and 7 days since last precipitation in local watershed		Stream
9. Evidence watercourse has been used as a supply of drinking water		Stream

NOTE : If any Primary Indicators 1-9 = "Yes", then STOP; absent directly contradictory evidence, determination is complete.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.4*

Overall Hydrologic Determination =

Secondary Indicator Score (if applicable) =

Justification / Notes :

A. elm
oak
nutsedge
giant ragweed

This data form is representative of WWC042.

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal =)	Absent	Weak	Moderate	Strong
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal =)	Absent	Weak	Moderate	Strong
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in stream bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal =)	Absent	Weak	Moderate	Strong
20. Fibrous roots in channel [1]	3	2	1	0
21. Rooted plants in channel [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	0.5	1	1.5
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel [2]	0	0.5	1	2

[1] Focus is on the presence of upland plants. [2] Focus is on the presence of aquatic or wetland plants.

Total Points = _____

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Appendix G

Representative Photographs

Latitude	N 35° 19' 40.19"
Longitude	W 89° 26' 37.82"
Time Stamp	11:25:49 AM
Date Stamp	1/14/2019
Photo Direction	57° ENE

S001

Latitude	N 35° 19' 22.60"
Longitude	W 89° 24' 39.20"
Time Stamp	10:11:27 AM
Date Stamp	11/14/2018
Photo Direction	15° NNE

S002

Latitude	N 35° 20' 06.94"
Longitude	W 89° 23' 40.45"
Time Stamp	9:06:28 AM
Date Stamp	1/15/2019
Photo Direction	97° E

S003

Latitude	N 35° 18' 57.95"
Longitude	W 89° 23' 37.04"
Time Stamp	12:37:15 PM
Date Stamp	1/16/2019
Photo Direction	26° NNE

S004

Latitude	N 35° 18' 27.11"
Longitude	W 89° 23' 33.89"
Time Stamp	11:35:23 AM
Date Stamp	1/16/2019
Photo Direction	285° WNW

S005

Latitude	N 35° 19' 30.54"
Longitude	W 89° 26' 53.70"
Time Stamp	11:37:46 AM
Date Stamp	1/14/2019
Photo Direction	11° N

S006

Latitude	N 35° 20' 29.70"
Longitude	W 89° 23' 38.06"
Time Stamp	10:31:51 AM
Date Stamp	3/12/2019
Photo Direction	253° WSW

S007

Latitude	N 35° 19' 26.84"
Longitude	W 89° 26' 28.73"
Time Stamp	2:36:33 PM
Date Stamp	1/14/2019
Photo Direction	295° WNW

S008

Latitude	N 35° 20' 07.25"
Longitude	W 89° 27' 24.85"
Time Stamp	11:09:19 AM
Date Stamp	1/14/2019
Photo Direction	177° S

S009

Latitude	N 35° 20' 04.69"
Longitude	W 89° 27' 11.99"
Time Stamp	12:15:07 PM
Date Stamp	1/14/2019
Photo Direction	329° NNW

S010

Latitude	N 35° 20' 03.88"
Longitude	W 89° 26' 56.56"
Time Stamp	12:38:01 PM
Date Stamp	1/14/2019
Photo Direction	206° SSW

S011

Latitude	N 35° 19' 39.82"
Longitude	W 89° 27' 07.24"
Time Stamp	10:05:36 AM
Date Stamp	1/14/2019
Photo Direction	176° S

S012

Latitude	N 35° 19' 32.02"
Longitude	W 89° 26' 55.07"
Time Stamp	11:40:30 AM
Date Stamp	1/14/2019
Photo Direction	279° W

S013

Latitude	N 35° 19' 32.13"
Longitude	W 89° 26' 41.39"
Time Stamp	2:45:45 PM
Date Stamp	1/14/2019
Photo Direction	339° NNW

S014

Latitude	N 35° 19' 19.79"
Longitude	W 89° 26' 36.31"
Time Stamp	1:39:51 PM
Date Stamp	1/14/2019
Photo Direction	169° S

S015

Latitude	N 35° 19' 41.62"
Longitude	W 89° 26' 14.07"
Time Stamp	3:42:52 PM
Date Stamp	1/14/2019
Photo Direction	255° WSW

S016

Latitude	N 35° 19' 19.63"
Longitude	W 89° 26' 21.59"
Time Stamp	3:12:01 PM
Date Stamp	1/14/2019
Photo Direction	6° N

S017

Latitude	N 35° 19' 39.42"
Longitude	W 89° 25' 58.16"
Time Stamp	2:26:02 PM
Date Stamp	1/14/2019
Photo Direction	145° SE

S019

Latitude	N 35° 19' 15.72"
Longitude	W 89° 26' 03.19"
Time Stamp	11:30:45 AM
Date Stamp	1/17/2019
Photo Direction	258° WSW

S020

Latitude	N 35° 19' 18.95"
Longitude	W 89° 26' 10.91"
Time Stamp	11:38:46 AM
Date Stamp	1/17/2019
Photo Direction	304° NW

S021

Latitude	N 35° 19' 09.77"
Longitude	W 89° 25' 47.53"
Time Stamp	11:05:40 AM
Date Stamp	1/17/2019
Photo Direction	335° NNW

S022

Latitude	N 35° 19' 06.22"
Longitude	W 89° 25' 33.22"
Time Stamp	10:46:39 AM
Date Stamp	1/17/2019
Photo Direction	78° ENE

S023

Latitude	N 35° 19' 35.34"
Longitude	W 89° 25' 27.37"
Time Stamp	8:46:26 AM
Date Stamp	11/13/2018
Photo Direction	133° SE

S024

Latitude	N 35° 19' 36.58"
Longitude	W 89° 25' 18.86"
Time Stamp	8:32:24 AM
Date Stamp	11/13/2018
Photo Direction	356° N

S025

Latitude	N 35° 19' 24.07"
Longitude	W 89° 25' 13.15"
Time Stamp	8:12:16 AM
Date Stamp	11/13/2018
Photo Direction	341° NNW

S027

Latitude	N 35° 19' 50.15"
Longitude	W 89° 24' 42.69"
Time Stamp	1:07:18 PM
Date Stamp	11/14/2018
Photo Direction	45° NE

S029

Latitude	N 35° 19' 54.08"
Longitude	W 89° 23' 38.12"
Time Stamp	1:43:28 PM
Date Stamp	1/15/2019
Photo Direction	197° SSW

S030

Latitude	N 35° 19' 46.52"
Longitude	W 89° 23' 14.96"
Time Stamp	1:13:31 PM
Date Stamp	1/15/2019
Photo Direction	63° ENE

S032

Latitude	N 35° 20' 00.65"
Longitude	W 89° 23' 18.70"
Time Stamp	12:29:03 PM
Date Stamp	1/15/2019
Photo Direction	198° SSW

S033

Latitude	N 35° 20' 01.66"
Longitude	W 89° 23' 16.20"
Time Stamp	12:27:03 PM
Date Stamp	1/15/2019
Photo Direction	266° W

S034

Latitude	N 35° 20' 10.83"
Longitude	W 89° 22' 50.54"
Time Stamp	9:34:05 AM
Date Stamp	3/12/2019
Photo Direction	358° N

S035

Latitude	N 35° 19' 38.96"
Longitude	W 89° 22' 42.94"
Time Stamp	9:47:48 AM
Date Stamp	1/15/2019
Photo Direction	55° NE

S036

Latitude	N 35° 19' 47.53"
Longitude	W 89° 22' 29.53"
Time Stamp	10:30:33 AM
Date Stamp	1/15/2019
Photo Direction	205° SSW

S037

Latitude	N 35° 20' 14.63"
Longitude	W 89° 22' 33.13"
Time Stamp	9:21:21 AM
Date Stamp	3/12/2019
Photo Direction	189° S

S038

Latitude	N 35° 20' 14.09"
Longitude	W 89° 22' 34.75"
Time Stamp	9:19:42 AM
Date Stamp	3/12/2019
Photo Direction	91° E

S039

Latitude	N 35° 20' 33.70"
Longitude	W 89° 23' 26.47"
Time Stamp	10:57:43 AM
Date Stamp	3/12/2019
Photo Direction	117° ESE

S040

Latitude	N 35° 20' 31.10"
Longitude	W 89° 23' 12.24"
Time Stamp	10:19:59 AM
Date Stamp	3/12/2019
Photo Direction	258° WSW

S041

Latitude	N 35° 20' 24.80"
Longitude	W 89° 23' 16.83"
Time Stamp	10:02:36 AM
Date Stamp	3/12/2019
Photo Direction	334° NNW

S042

Latitude	N 35° 20' 31.73"
Longitude	W 89° 23' 02.90"
Time Stamp	10:31:38 AM
Date Stamp	3/12/2019
Photo Direction	248° WSW

S043

Latitude	N 35° 20' 26.93"
Longitude	W 89° 22' 37.47"
Time Stamp	9:00:09 AM
Date Stamp	3/12/2019
Photo Direction	297° WNW

S046

Latitude	N 35° 20' 21.89"
Longitude	W 89° 22' 04.04"
Time Stamp	12:37:10 PM
Date Stamp	1/15/2019
Photo Direction	292° WNW

S049

Latitude	N 35° 20' 17.04"
Longitude	W 89° 22' 01.55"
Time Stamp	12:33:07 PM
Date Stamp	1/15/2019
Photo Direction	339° NNW

S050

Latitude	N 35° 20' 14.39"
Longitude	W 89° 23' 08.56"
Time Stamp	11:10:15 AM
Date Stamp	1/15/2019
Photo Direction	197° SSW

S051

Latitude	N 35° 18' 31.99"
Longitude	W 89° 23' 23.15"
Time Stamp	9:29:54 AM
Date Stamp	1/16/2019
Photo Direction	90° E

S052

Latitude	N 35° 18' 47.95"
Longitude	W 89° 23' 47.62"
Time Stamp	12:28:18 PM
Date Stamp	1/16/2019
Photo Direction	206° SSW

S053

Latitude	N 35° 18' 50.82"
Longitude	W 89° 23' 46.00"
Time Stamp	12:32:55 PM
Date Stamp	1/16/2019
Photo Direction	62° ENE

S054

Latitude	N 35° 18' 57.80"
Longitude	W 89° 23' 16.80"
Time Stamp	10:59:28 AM
Date Stamp	1/16/2019
Photo Direction	184° S

S055

Latitude	N 35° 18' 54.06"
Longitude	W 89° 22' 54.80"
Time Stamp	10:45:51 AM
Date Stamp	1/16/2019
Photo Direction	281° W

S056

Latitude	N 35° 20' 29.91"
Longitude	W 89° 23' 34.49"
Time Stamp	10:35:26 AM
Date Stamp	3/12/2019
Photo Direction	80° E

S057

Stream features without associated photos include S018, S028, S044, S045, S047, and S048.

Latitude	N 35° 19' 31.05"
Longitude	W 89° 26' 09.71"
Photo Direction	308° NW
Time Stamp	5:41:24 AM
Date Stamp	4/11/2019

W01

Latitude	N 35° 18' 55.00"
Longitude	W 89° 23' 11.28"
Photo Direction	339° NNW
Time Stamp	10:59:50 AM
Date Stamp	1/16/2019

W03

Latitude	N 35° 19' 37.08"
Longitude	W 89° 24' 55.49"
Photo Direction	250° WSW
Time Stamp	2:00:28 PM
Date Stamp	11/14/2018

W08

Latitude	N 35° 19' 31.97"
Longitude	W 89° 26' 49.58"
Photo Direction	355° N
Time Stamp	11:28:46 AM
Date Stamp	1/14/2019

W09

Latitude	N 35° 19' 10.72"
Longitude	W 89° 26' 00.00"
Photo Direction	195° SSW
Time Stamp	11:25:09 AM
Date Stamp	1/17/2019

W10

Latitude	N 35° 19' 13.62"
Longitude	W 89° 25' 57.37"
Photo Direction	330° NNW
Time Stamp	11:17:12 AM
Date Stamp	1/17/2019

W11

Latitude	N 35° 19' 10.25"
Longitude	W 89° 25' 53.85"
Photo Direction	175° S
Time Stamp	11:22:30 AM
Date Stamp	1/17/2019

W12

Latitude	N 35° 19' 05.53"
Longitude	W 89° 25' 44.02"
Photo Direction	339° NNW
Time Stamp	10:58:05 AM
Date Stamp	1/17/2019

W14

Latitude	N 35° 19' 00.31"
Longitude	W 89° 23' 41.27"
Photo Direction	276° W
Time Stamp	12:41:13 PM
Date Stamp	1/16/2019

W16

Latitude	N 35° 19' 23.44"
Longitude	W 89° 24' 45.82"
Photo Direction	244° WSW
Time Stamp	12:24:49 PM
Date Stamp	11/14/2018

W17

Latitude	N 35° 19' 28.71"
Longitude	W 89° 24' 40.60"
Photo Direction	97° E
Time Stamp	10:28:42 AM
Date Stamp	11/14/2018

W18

Latitude	N 35° 19' 23.41"
Longitude	W 89° 24' 55.10"
Photo Direction	166° SSE
Time Stamp	8:02:01 AM
Date Stamp	11/14/2018

W19

Latitude	N 35° 19' 58.37"
Longitude	W 89° 22' 38.10"
Photo Direction	276° W
Time Stamp	8:36:10 AM
Date Stamp	1/15/2019

W20

Latitude	N 35° 19' 51.63"
Longitude	W 89° 23' 52.73"
Photo Direction	163° SSE
Time Stamp	2:33:28 PM
Date Stamp	1/15/2019

W21

Latitude	N 35° 20' 05.74"
Longitude	W 89° 23' 00.38"
Photo Direction	259° W
Time Stamp	12:10:11 PM
Date Stamp	1/15/2019

W22

Latitude	N 35° 19' 41.92"
Longitude	W 89° 22' 18.24"
Photo Direction	332° NNW
Time Stamp	2:08:10 PM
Date Stamp	1/15/2019

W23

Latitude	N 35° 19' 40.82"
Longitude	W 89° 22' 13.08"
Photo Direction	202° SSW
Time Stamp	2:01:57 PM
Date Stamp	1/15/2019

W24

Latitude	N 35° 20' 11.76"
Longitude	W 89° 21' 53.83"
Photo Direction	145° SE
Time Stamp	12:53:05 PM
Date Stamp	1/15/2019

W26

Latitude	N 35° 20' 13.91"
Longitude	W 89° 22' 16.02"
Photo Direction	188° S
Time Stamp	11:53:32 AM
Date Stamp	1/15/2019

W27

Latitude	N 35° 19' 47.53"
Longitude	W 89° 22' 29.53"
Photo Direction	53° NE
Time Stamp	10:30:30 AM
Date Stamp	1/15/2019

W28

Latitude	N 35° 19' 33.00"
Longitude	W 89° 23' 29.55"
Photo Direction	314° NW
Time Stamp	9:47:47 AM
Date Stamp	1/16/2019

W29

Latitude	N 35° 19' 39.77"
Longitude	W 89° 23' 35.51"
Photo Direction	147° SSE
Time Stamp	2:13:36 PM
Date Stamp	1/15/2019

W30

Latitude	N 35° 19' 11.74"
Longitude	W 89° 23' 12.98"
Photo Direction	88° E
Time Stamp	10:02:30 AM
Date Stamp	1/16/2019

W31

Latitude	N 35° 18' 23.76"
Longitude	W 89° 23' 44.73"
Photo Direction	223° SW
Time Stamp	11:54:30 AM
Date Stamp	1/16/2019

W32

Latitude	N 35° 19' 14.69"
Longitude	W 89° 26' 20.93"
Photo Direction	121° ESE
Time Stamp	2:09:51 PM
Date Stamp	1/14/2019

W33

Latitude	N 35° 19' 16.83"
Longitude	W 89° 26' 21.70"
Photo Direction	161° SSE
Time Stamp	2:07:57 PM
Date Stamp	1/14/2019

W34

Latitude	N 35° 19' 33.44"
Longitude	W 89° 26' 39.97"
Photo Direction	342° NNW
Time Stamp	2:55:31 PM
Date Stamp	1/14/2019

W35

Latitude	N 35° 19' 33.44"
Longitude	W 89° 26' 13.10"
Photo Direction	250° WSW
Time Stamp	3:18:53 PM
Date Stamp	1/14/2019

W36

Latitude	N 35° 19' 38.13"
Longitude	W 89° 26' 24.94"
Photo Direction	308° NW
Time Stamp	3:32:08 PM
Date Stamp	1/14/2019

W37

Latitude	N 35° 19' 29.19"
Longitude	W 89° 27' 05.37"
Photo Direction	188° S
Time Stamp	9:54:52 AM
Date Stamp	1/14/2019

W38

Latitude	N 35° 19' 16.24"
Longitude	W 89° 26' 32.17"
Photo Direction	289° WNW
Time Stamp	1:24:47 PM
Date Stamp	1/14/2019

W39

Latitude	N 35° 19' 18.69"
Longitude	W 89° 25' 28.39"
Photo Direction	140° SE
Time Stamp	12:09:09 PM
Date Stamp	1/17/2019

W40

Latitude	N 35° 19' 57.87"
Longitude	W 89° 22' 39.28"
Photo Direction	156° SSE
Time Stamp	8:42:18 AM
Date Stamp	1/15/2019

W41

Latitude	N 35° 20' 33.34"
Longitude	W 89° 23' 15.98"
Photo Direction	72° ENE
Time Stamp	10:13:38 AM
Date Stamp	3/12/2019

W42

Latitude	N 35° 20' 27.04"
Longitude	W 89° 23' 39.05"
Photo Direction	2° N
Time Stamp	10:21:27 AM
Date Stamp	3/12/2019

W43

Latitude	N 35° 20' 31.35"
Longitude	W 89° 23' 10.35"
Photo Direction	61° ENE
Time Stamp	10:21:15 AM
Date Stamp	3/12/2019

W44

Latitude	N 35° 20' 22.92"
Longitude	W 89° 22' 38.46"
Photo Direction	188° S
Time Stamp	10:02:19 AM
Date Stamp	3/12/2019

W45

Photo Direction	263° W
Latitude	N 35° 19' 56.97"
Longitude	W 89° 27' 25.09"
Time Stamp	10:55:33 AM
Date Stamp	1/14/2019

WWC001

Photo Direction	357° N
Latitude	N 35° 19' 59.49"
Longitude	W 89° 27' 19.27"
Time Stamp	11:47:51 AM
Date Stamp	1/14/2019

WWC002

Photo Direction	150° SSE
Latitude	N 35° 20' 04.95"
Longitude	W 89° 26' 57.35"
Time Stamp	12:25:58 PM
Date Stamp	1/14/2019

WWC003

Photo Direction	155° SSE
Latitude	N 35° 19' 50.77"
Longitude	W 89° 27' 04.88"
Time Stamp	12:58:53 PM
Date Stamp	1/14/2019

WWC004

Photo Direction	327° NNW
Latitude	N 35° 19' 47.55"
Longitude	W 89° 27' 00.46"
Time Stamp	10:37:03 AM
Date Stamp	1/14/2019

WWC005

Photo Direction	301° WNW
Latitude	N 35° 19' 44.94"
Longitude	W 89° 27' 10.04"
Time Stamp	10:12:19 AM
Date Stamp	1/14/2019

WWC006

Photo Direction	44° NE
Latitude	N 35° 19' 50.37"
Longitude	W 89° 27' 15.45"
Time Stamp	10:07:38 AM
Date Stamp	1/14/2019

WWC007

Photo Direction	344° NNW
Latitude	N 35° 19' 46.28"
Longitude	W 89° 27' 24.24"
Time Stamp	9:50:43 AM
Date Stamp	1/14/2019

WWC008

Photo Direction	253° WSW
Latitude	N 35° 19' 37.82"
Longitude	W 89° 27' 18.12"
Time Stamp	9:20:38 AM
Date Stamp	1/14/2019

WWC009

Photo Direction	133° SE
Latitude	N 35° 19' 25.97"
Longitude	W 89° 27' 17.95"
Time Stamp	9:30:48 AM
Date Stamp	1/14/2019

WWC010

Photo Direction	45° NE
Latitude	N 35° 19' 36.97"
Longitude	W 89° 27' 07.82"
Time Stamp	1:15:26 PM
Date Stamp	1/14/2019

WWC011

Photo Direction	343° NNW
Latitude	N 35° 19' 33.92"
Longitude	W 89° 26' 59.30"
Time Stamp	11:48:20 AM
Date Stamp	1/14/2019

WWC012

Photo Direction	193° SSW
Latitude	N 35° 19' 36.07"
Longitude	W 89° 26' 57.43"
Time Stamp	11:45:39 AM
Date Stamp	1/14/2019

WWC013

Photo Direction	154° SSE
Latitude	N 35° 19' 38.20"
Longitude	W 89° 26' 24.78"
Time Stamp	3:31:51 PM
Date Stamp	1/14/2019

WWC014

Photo Direction	66° ENE
Latitude	N 35° 19' 37.23"
Longitude	W 89° 26' 35.68"
Time Stamp	2:44:52 PM
Date Stamp	1/14/2019

WWC015

Photo Direction	298° WNW
Latitude	N 35° 19' 39.99"
Longitude	W 89° 26' 21.54"
Time Stamp	3:29:36 PM
Date Stamp	1/14/2019

WWC016

Photo Direction	222° SW
Latitude	N 35° 19' 46.41"
Longitude	W 89° 26' 10.08"
Time Stamp	3:21:11 PM
Date Stamp	1/14/2019

WWC017

Photo Direction	58° ENE
Latitude	N 35° 19' 46.94"
Longitude	W 89° 25' 58.00"
Time Stamp	2:33:52 PM
Date Stamp	1/14/2019

WWC018

Photo Direction	43° NE
Latitude	N 35° 19' 31.24"
Longitude	W 89° 26' 00.33"
Time Stamp	11:59:13 AM
Date Stamp	11/13/2018

WWC019

Photo Direction	333° NNW
Latitude	N 35° 19' 33.60"
Longitude	W 89° 25' 55.58"
Time Stamp	12:10:26 PM
Date Stamp	11/13/2018

WWC020

Photo Direction	136° SE
Latitude	N 35° 19' 32.52"
Longitude	W 89° 25' 53.93"
Time Stamp	12:12:07 PM
Date Stamp	11/13/2018

WWC021

Photo Direction	60° ENE
Latitude	N 35° 19' 28.93"
Longitude	W 89° 25' 47.75"
Time Stamp	12:30:22 PM
Date Stamp	11/13/2018

WWC022

Photo Direction	7° N
Latitude	N 35° 19' 31.66"
Longitude	W 89° 25' 36.33"
Time Stamp	9:30:35 AM
Date Stamp	11/13/2018

WWC026

Photo Direction	26° NNE
Latitude	N 35° 19' 32.64"
Longitude	W 89° 25' 26.28"
Time Stamp	8:58:53 AM
Date Stamp	11/13/2018

WWC027

Photo Direction	282° WNW
Latitude	N 35° 19' 11.78"
Longitude	W 89° 26' 31.12"
Time Stamp	1:28:14 PM
Date Stamp	1/14/2019

WWC028

Photo Direction	309° NW
Latitude	N 35° 19' 07.47"
Longitude	W 89° 26' 20.38"
Time Stamp	2:19:57 PM
Date Stamp	1/14/2019

WWC029

Photo Direction	6° N
Latitude	N 35° 19' 19.63"
Longitude	W 89° 26' 21.59"
Time Stamp	3:12:01 PM
Date Stamp	1/14/2019

WWC030

Photo Direction	92° E
Latitude	N 35° 19' 23.67"
Longitude	W 89° 25' 54.40"
Time Stamp	12:50:17 PM
Date Stamp	11/13/2018

WWC031

Photo Direction	335° NNW
Latitude	N 35° 19' 20.91"
Longitude	W 89° 26' 06.21"
Time Stamp	1:04:15 PM
Date Stamp	11/13/2018

WWC034

Photo Direction	167° SSE
Latitude	N 35° 19' 18.41"
Longitude	W 89° 25' 45.94"
Time Stamp	11:55:16 AM
Date Stamp	1/17/2019

WWC035

Photo Direction	161° SSE
Latitude	N 35° 19' 12.25"
Longitude	W 89° 26' 00.88"
Time Stamp	11:21:24 AM
Date Stamp	1/17/2019

WWC036

Photo Direction	193° SSW
Latitude	N 35° 19' 04.43"
Longitude	W 89° 25' 45.39"
Time Stamp	10:59:03 AM
Date Stamp	1/17/2019

WWC037

Photo Direction	11° N
Latitude	N 35° 19' 06.33"
Longitude	W 89° 25' 34.16"
Time Stamp	10:47:44 AM
Date Stamp	1/17/2019

WWC039

Photo Direction	14° NNE
Latitude	N 35° 19' 07.44"
Longitude	W 89° 25' 29.98"
Time Stamp	10:29:04 AM
Date Stamp	1/17/2019

WWC040

Photo Direction	67° ENE
Latitude	N 35° 19' 07.22"
Longitude	W 89° 25' 25.86"
Time Stamp	10:22:33 AM
Date Stamp	1/17/2019

WWC041

Photo Direction	162° SSE
Latitude	N 35° 19' 18.60"
Longitude	W 89° 25' 11.99"
Time Stamp	9:53:21 AM
Date Stamp	1/17/2019

WWC042

Photo Direction	193° SSW
Latitude	N 35° 19' 24.15"
Longitude	W 89° 25' 13.94"
Time Stamp	8:05:36 AM
Date Stamp	11/13/2018

WWC043

Photo Direction	341° NNW
Latitude	N 35° 19' 24.07"
Longitude	W 89° 25' 13.15"
Time Stamp	8:12:16 AM
Date Stamp	11/13/2018

WWC044

Photo Direction	201° SSW
Latitude	N 35° 19' 31.03"
Longitude	W 89° 25' 17.02"
Time Stamp	8:21:43 AM
Date Stamp	11/13/2018

WWC045

Photo Direction	182° S
Latitude	N 35° 19' 36.84"
Longitude	W 89° 25' 22.73"
Time Stamp	8:38:30 AM
Date Stamp	11/13/2018

WWC046

Photo Direction	144° SE
Latitude	N 35° 19' 47.13"
Longitude	W 89° 24' 50.38"
Time Stamp	1:23:26 PM
Date Stamp	11/14/2018

WWC049

Photo Direction	167° SSE
Latitude	N 35° 19' 18.41"
Longitude	W 89° 25' 45.94"
Time Stamp	11:55:16 AM
Date Stamp	1/17/2019

WWC050

Photo Direction	270° W
Latitude	N 35° 19' 55.12"
Longitude	W 89° 24' 37.77"
Time Stamp	2:17:07 PM
Date Stamp	1/16/2019

WWC051

Photo Direction	309° NW
Latitude	N 35° 20' 06.07"
Longitude	W 89° 24' 26.29"
Time Stamp	3:11:16 PM
Date Stamp	1/16/2019

WWC052

Photo Direction	6° N
Latitude	N 35° 20' 09.43"
Longitude	W 89° 24' 02.64"
Time Stamp	3:26:32 PM
Date Stamp	1/16/2019

WWC053

Photo Direction	102° ESE
Latitude	N 35° 19' 47.00"
Longitude	W 89° 23' 39.10"
Time Stamp	1:49:39 PM
Date Stamp	1/15/2019

WWC054

Photo Direction	231° SW
Latitude	N 35° 19' 34.16"
Longitude	W 89° 23' 29.85"
Time Stamp	9:49:05 AM
Date Stamp	1/16/2019

WWC055

Photo Direction	304° NW
Latitude	N 35° 19' 33.90"
Longitude	W 89° 23' 21.31"
Time Stamp	9:57:56 AM
Date Stamp	1/16/2019

WWC056

Photo Direction	161° SSE
Latitude	N 35° 19' 11.46"
Longitude	W 89° 23' 11.56"
Time Stamp	10:04:09 AM
Date Stamp	1/16/2019

WWC057

Photo Direction	52° NE
Latitude	N 35° 19' 10.04"
Longitude	W 89° 23' 43.00"
Time Stamp	9:25:33 AM
Date Stamp	1/16/2019

WWC058

Photo Direction	
Latitude	N 35° 19' 11.52"
Longitude	W 89° 23' 30.92"
Time Stamp	9:33:36 AM
Date Stamp	1/16/2019

WWC059

Photo Direction	242° WSW
Latitude	N 35° 19' 03.10"
Longitude	W 89° 23' 27.76"
Time Stamp	11:24:17 AM
Date Stamp	1/16/2019

WWC060

Photo Direction	325° NW
Latitude	N 35° 18' 57.80"
Longitude	W 89° 23' 16.80"
Time Stamp	10:59:23 AM
Date Stamp	1/16/2019

WWC061

Photo Direction	240° WSW
Latitude	N 35° 18' 29.55"
Longitude	W 89° 23' 47.98"
Time Stamp	12:07:57 PM
Date Stamp	1/16/2019

WWC062

Photo Direction	258° WSW
Latitude	N 35° 18' 26.80"
Longitude	W 89° 23' 37.35"
Time Stamp	11:41:03 AM
Date Stamp	1/16/2019

WWC063

Photo Direction	205° SSW
Latitude	N 35° 18' 29.19"
Longitude	W 89° 23' 29.71"
Time Stamp	10:20:19 AM
Date Stamp	1/16/2019

WWC064

Photo Direction	307° NW
Latitude	N 35° 18' 29.41"
Longitude	W 89° 23' 25.70"
Time Stamp	10:27:59 AM
Date Stamp	1/16/2019

WWC065

Photo Direction	126° SE
Latitude	N 35° 18' 20.75"
Longitude	W 89° 23' 22.29"
Time Stamp	10:45:21 AM
Date Stamp	1/16/2019

WWC066

Photo Direction	165° SSE
Latitude	N 35° 19' 47.25"
Longitude	W 89° 23' 17.43"
Time Stamp	1:25:57 PM
Date Stamp	1/15/2019

WWC067

Photo Direction	329° NNW
Latitude	N 35° 19' 54.90"
Longitude	W 89° 23' 22.02"
Time Stamp	12:35:45 PM
Date Stamp	1/15/2019

WWC068

Photo Direction	81° E
Latitude	N 35° 19' 44.28"
Longitude	W 89° 23' 09.72"
Time Stamp	1:18:50 PM
Date Stamp	1/15/2019

WWC069

Photo Direction	210° SSW
Latitude	N 35° 19' 55.41"
Longitude	W 89° 22' 54.42"
Time Stamp	9:20:34 AM
Date Stamp	1/15/2019

WWC070

Photo Direction	323° NW
Latitude	N 35° 19' 58.32"
Longitude	W 89° 22' 54.20"
Time Stamp	9:12:14 AM
Date Stamp	1/15/2019

WWC072

Photo Direction	285° WNW
Latitude	N 35° 20' 01.60"
Longitude	W 89° 22' 47.50"
Time Stamp	8:57:25 AM
Date Stamp	1/15/2019

WWC073

Photo Direction	58° ENE
Latitude	N 35° 20' 03.55"
Longitude	W 89° 22' 48.68"
Time Stamp	9:03:35 AM
Date Stamp	1/15/2019

WWC074

Photo Direction	233° SW
Latitude	N 35° 20' 11.79"
Longitude	W 89° 22' 49.80"
Time Stamp	9:35:31 AM
Date Stamp	3/12/2019

WWC075

Photo Direction	300° WNW
Latitude	N 35° 20' 10.34"
Longitude	W 89° 22' 47.63"
Time Stamp	9:30:48 AM
Date Stamp	3/12/2019

WWC076

Photo Direction	66° ENE
Latitude	N 35° 20' 08.39"
Longitude	W 89° 23' 41.52"
Time Stamp	10:02:00 AM
Date Stamp	1/15/2019

WWC077

Photo Direction	28° NNE
Latitude	N 35° 20' 17.99"
Longitude	W 89° 23' 05.76"
Time Stamp	9:52:52 AM
Date Stamp	3/12/2019

WWC078

Photo Direction	273° W
Latitude	N 35° 20' 25.14"
Longitude	W 89° 23' 38.03"
Time Stamp	10:16:31 AM
Date Stamp	3/12/2019

WWC079

Photo Direction	305° NW
Latitude	N 35° 20' 26.51"
Longitude	W 89° 23' 37.87"
Time Stamp	10:26:16 AM
Date Stamp	3/12/2019

WWC080

Photo Direction	333° NNW
Latitude	N 35° 20' 29.91"
Longitude	W 89° 23' 34.49"
Time Stamp	10:35:24 AM
Date Stamp	3/12/2019

WWC081

Photo Direction	276° W
Latitude	N 35° 20' 28.72"
Longitude	W 89° 23' 31.17"
Time Stamp	10:39:52 AM
Date Stamp	3/12/2019

WWC082

Photo Direction	35° NE
Latitude	N 35° 20' 31.24"
Longitude	W 89° 23' 18.64"
Time Stamp	10:10:13 AM
Date Stamp	3/12/2019

WWC085

Photo Direction	129° SE
Latitude	N 35° 20' 24.81"
Longitude	W 89° 23' 16.83"
Time Stamp	10:02:39 AM
Date Stamp	3/12/2019

WWC086

Photo Direction	340° NNW
Latitude	N 35° 20' 32.50"
Longitude	W 89° 23' 10.48"
Time Stamp	10:23:20 AM
Date Stamp	3/12/2019

WWC087

Photo Direction	196° SSW
Latitude	N 35° 20' 26.73"
Longitude	W 89° 22' 44.50"
Time Stamp	8:50:06 AM
Date Stamp	3/12/2019

WWC088

Photo Direction	203° SSW
Latitude	N 35° 20' 26.21"
Longitude	W 89° 22' 41.37"
Time Stamp	8:58:35 AM
Date Stamp	3/12/2019

WWC089

Photo Direction	32° NNE
Latitude	N 35° 20' 23.03"
Longitude	W 89° 22' 37.31"
Time Stamp	9:05:29 AM
Date Stamp	3/12/2019

WWC090

Photo Direction	86° E
Latitude	N 35° 20' 18.00"
Longitude	W 89° 22' 35.96"
Time Stamp	9:14:32 AM
Date Stamp	3/12/2019

WWC091

Photo Direction	72° ENE
Latitude	N 35° 20' 13.98"
Longitude	W 89° 22' 37.55"
Time Stamp	9:17:32 AM
Date Stamp	3/12/2019

WWC092

Photo Direction	89° E
Latitude	N 35° 20' 11.79"
Longitude	W 89° 22' 37.20"
Time Stamp	9:19:45 AM
Date Stamp	3/12/2019

WWC093

Photo Direction	179° S
Latitude	N 35° 19' 56.70"
Longitude	W 89° 22' 38.51"
Time Stamp	8:45:20 AM
Date Stamp	1/15/2019

WWC094

Photo Direction	335° NNW
Latitude	N 35° 20' 11.82"
Longitude	W 89° 22' 02.84"
Time Stamp	12:28:49 PM
Date Stamp	1/15/2019

WWC095

Photo Direction	71° ENE
Latitude	N 35° 19' 47.11"
Longitude	W 89° 22' 13.08"
Time Stamp	2:06:59 PM
Date Stamp	1/15/2019

WWC096

Photo Direction	78° ENE
Latitude	N 35° 19' 39.77"
Longitude	W 89° 22' 12.70"
Time Stamp	2:03:35 PM
Date Stamp	1/15/2019

WWC097

Photo Direction	89° E
Latitude	N 35° 20' 13.91"
Longitude	W 89° 21' 53.31"
Time Stamp	12:50:15 PM
Date Stamp	1/15/2019

WWC098

Photo Direction	335° NNW
Latitude	N 35° 20' 11.82"
Longitude	W 89° 22' 02.84"
Time Stamp	12:28:49 PM
Date Stamp	1/15/2019

WWC099

Photo Direction	51° NE
Latitude	N 35° 20' 17.66"
Longitude	W 89° 22' 07.23"
Time Stamp	12:32:49 PM
Date Stamp	1/15/2019

WWC100

Photo Direction	51° NE
Latitude	N 35° 20' 17.66"
Longitude	W 89° 22' 07.23"
Time Stamp	12:32:49 PM
Date Stamp	1/15/2019

WWC101

Photo Direction	208° SSW
Latitude	N 35° 20' 14.69"
Longitude	W 89° 22' 19.76"
Time Stamp	12:00:54 PM
Date Stamp	1/15/2019

WWC104

WWC features without associated photos include WWC023, WWC024, WWC025, WWC032, WWC033, WWC047, WWC048, WWC083, WWC102, WWC103, and WWC105.

STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DIVISION OF WATER RESOURCES
Memphis Environmental Field Office
8383 Wolf Lake Drive
Bartlett, TN 38133
Phone 901-371-3000 Statewide 1-888-891-8332 Fax 901-371-3170

December 2, 2019

Jorie Fox
Yum Yum Solar, LLC
One South Wacker Drive
Suite1800
Chicago, IL, 60606

Re: Hydrologic Determination #QHP1905.011
Yum Yum Solar Hydrologic Determination Report
Fayette County, TN

Ms. Fox,

The Division of Water Resources has reviewed the documentation prepared by Kelly Thames (Qualified Hydrologic Professional in Training) with HDR, Inc. seeking concurrence with the report that was submitted in support of the Hydrologic Determinations conducted for the above referenced locations in Fayette County, TN.

The Division is in concurrence with the following submitted assertions, which are summarized on the attached Appendices.

One hundred and six (106) out of one hundred nine (109) of the features identified as wet weather conveyances are wet weather conveyances. The exceptions being the features identified as WWC 15, WWC 23 and WWC 24. These features lacked the appropriate information in support of the wet weather conveyance classification reported and are hereby considered streams unless additional information is submitted in support of the wet weather conveyance designation.

There are sixty one (61) features that are streams (including WWC 15, WWC 23 and WWC 24).

Additionally, there were twenty four (24) wetlands delineated on the site totaling 43.78 acres.

Any alterations to wet weather conveyances must be made in accordance with the requirements of Tenn. Code Ann. § 69-3-108(q). Alterations to streams and wetlands require authorization under an appropriate Aquatic Resource Alteration Permit (ARAP). You can download the ARAP application form at the following web address: http://tdec.tn.gov/etdec/DownloadFile.aspx?row_id=CN-1091

If you have any questions, please feel free to contact me at (901) 371-3019 or at Lew.Hoffman@tn.gov.

Thank you,

Lew E. Hoffman

Lew E. Hoffman
Environmental Consultant
Division of Water Resources
Memphis Environmental Field Office

Copy: Kelly Thames, Environmental Scientist, HDR, Inc.
file

Yum Yum Solar Project

Vegetation and Wildlife Assessment Report

Fayette County, TN

Confidential Business Information

Table of Contents

1.0 Introduction 4
2.0 Vegetation Field Survey 5
2.1 Methods 5
2.2 Results 8
2.2.1 Vegetation Communities 8
2.2.2 Non-native and invasive plants 10
2.2.3 Federal- and state-listed threatened and endangered plants 10
2.2.4 Other plants of conservation concern 11
3.0 Wildlife Survey 12
3.1 Methods 12
3.2 Results 13
3.2.1 Wildlife in the Project Area 13
3.2.2 Federally- and State-Listed Wildlife 14
3.2.3. Bald and Golden Eagle Protection Act 17
3.2.4. Migratory Bird Treaty Act 17
3.2.5. Other Wildlife Species of Concern 21
4.0 Cited Sources 22

List of Tables:

Table 2.1. On-Site Vegetation Communities.....8

Table 2.2. State-listed Plant Species in Fayette County, TN……....11

Table 2.3. Plant Species of Special Concern in Fayette County, TN……..…12

Table 3.1. Wildlife Species Observed in Project Area……....13

Table 3.2. State and Federally-listed wildlife, status, preferred habitat, and presence of habitat in the Yum Yum Solar Project Area, Fayette County, Tennessee……....15

Table 3.3. Birds of Conservation Concern and Migratory Bird List…….....18

Table 3.4 Other wildlife species of concern potentially occurring in the Project Area……...21

List of Figures:

Figure 1. Yum Yum Solar Project Location, Fayette County, Tennessee, 2019.

Figure 2. Vegetation Community Types Within the Yum Yum Solar Project Area, Fayette County, Tennessee, 2019.

Figure 3. Breeding Bird Survey Routes, Christmas Bird Count Survey Routes, and Important Bird Areas within 10 miles of the Yum Yum Solar Project Area, Fayette County, Tennessee, 2019.

Appendices:

Appendix A: IPaC Results

Appendix B: Photo Log

Appendix C: Field Notes

1.0 Introduction

Yum Yum Solar LLC (Yum Yum Solar), a subsidiary of Invenergy Solar Project Development, LLC (Invenergy), is proposing to develop the Yum Yum Solar Energy Center which would be constructed and operated by Yum Yum Solar and would have alternating current (AC) generating capacity of 147 megawatts (MW). As part of a Power Purchase Agreement (PPA) between the Tennessee Valley Authority (TVA) and Yum Yum Solar, TVA would construct a proposed Yum Yum 161-kV Switching Station in association with the Yum Yum Solar Energy Center. A short 161-kV transmission line (TL) would connect the new switching station to TVA's adjacent existing Cordova-South Jackson 161-kV TL. Together, the proposed Yum Yum Solar Energy Center and TVA's proposed switching station and TL are herein referred to as the "Project."

The Project Area, which includes portions of 25 individual tracts, encompasses nearly 2,876 contiguous acres in rural Fayette County, Tennessee, southwest of the unincorporated community of Yum Yum (Figure 1).

The Project Area is located in Fayette County, Tennessee, within the Loosahatchie watershed. This area lies within the Mississippi Valley Loess Plains Level III Ecoregion which contains two Level IV subecoregions. The Project Area is located within the Loess Plains subecoregion, which is characterized by gently rolling, irregular plains, 250 to 500 feet in elevation with loess up to 50 feet thick. The region is a large producer of agricultural products, including soybeans, cotton, corn, milo, and sorghum crops in addition to livestock and poultry. Woodlands consist of oak-hickory and southern floodplain forests, though they are fragmented due to the large amount of cropland. Cypress-gum swamp habitat remains present in some swamp and wetland areas (USEPA 2017a).

On November 11-16, 2018, January 12-18, 2019, March 12-13, 2019 and April 10-11, 2019, Yum Yum Solar conducted field surveys following TVA's *Guidelines for Conducting Biological and Cultural Surveys and Impact Analysis* (Tennessee Valley Authority, 2017) to map vegetation and identify the potential for wildlife within the Project Area. This report documents the results of those field surveys.

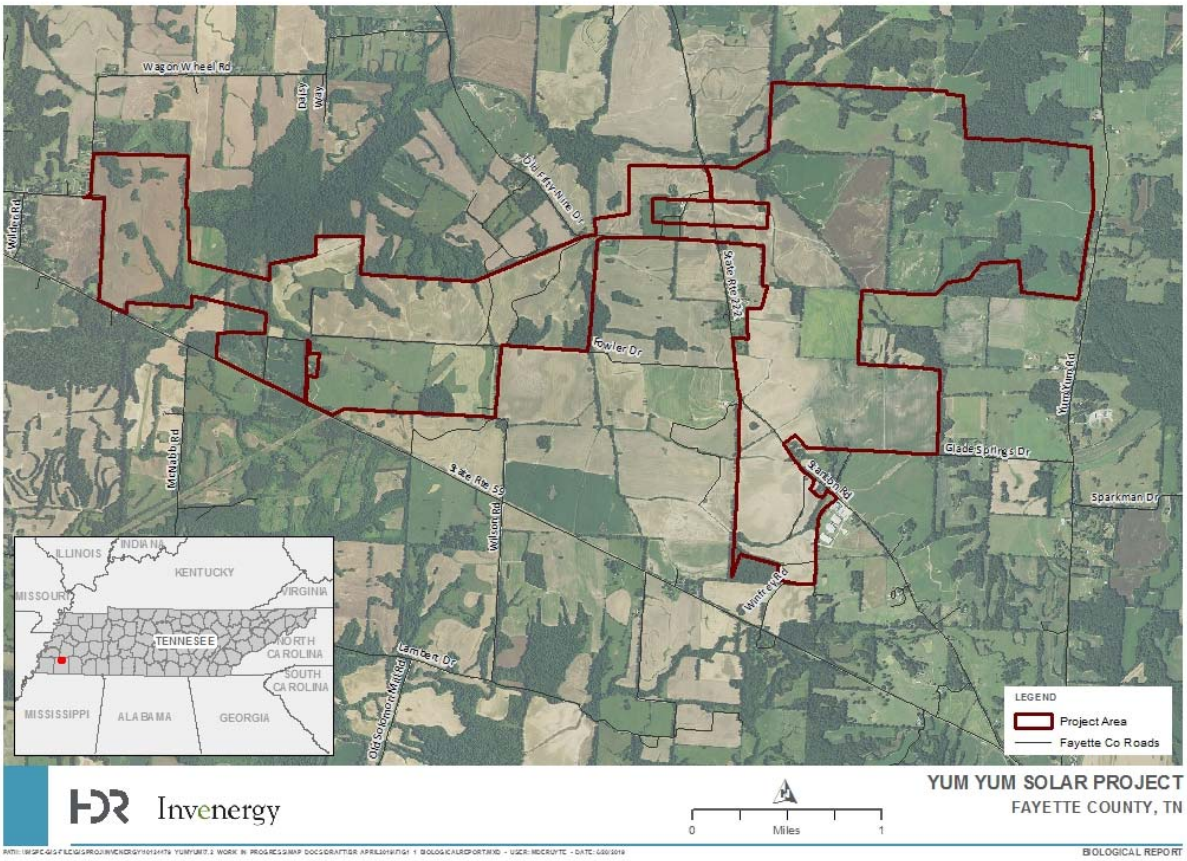

Figure 1. Yum Yum Solar Project Area, Fayette County, Tennessee, 2019.

2.0 Vegetation Field Survey

2.1 Methods

Following TVA guidelines (Tennessee Valley Authority, 2017), Yum Yum Solar referenced the U.S. Fish and Wildlife Service (USFWS) Information for Planning and Conservation (IPaC) database for federally threatened and endangered plants, and the TVA Heritage Database (Tennessee Valley Authority, 2019) for state listed plants within a 5-mile buffer of and including the Project Area. Results are included in Appendix A.

Yum Yum Solar mapped the vegetation within the Project Area using the National Land Cover Database (U.S. Department of Interior & U.S. Geological Survey, 2018) and 2016 aerial imagery (US Department of Agriculture, 2016) to understand vegetation and create a base map for field surveys.

A pedestrian survey of the approximately 2,876-acre Project Area was conducted on November 11-16, 2018, January 12-18, 2019, March 12-13, 2019 and April 10-11, 2019 to document plant communities, invasive plants, and to conduct a search for threatened and endangered plant species. However, no plant species-specific surveys were conducted.

Biologists traversed the Project Area by conducting a meander search of the 2,876-acre Project Area on foot at a casual pace. Plant communities observed within the Project Area were classified to the macrogroup level using the Grossman et al. 1998 (Grossman, 1998) classification system (Table 2.1). Plant communities were delineated using ArcMap (Figure 2) and the area of each plant community type was calculated as a percentage of the total Project Area. The general location and abundance of non-native invasive plants present within the Project Area were noted.

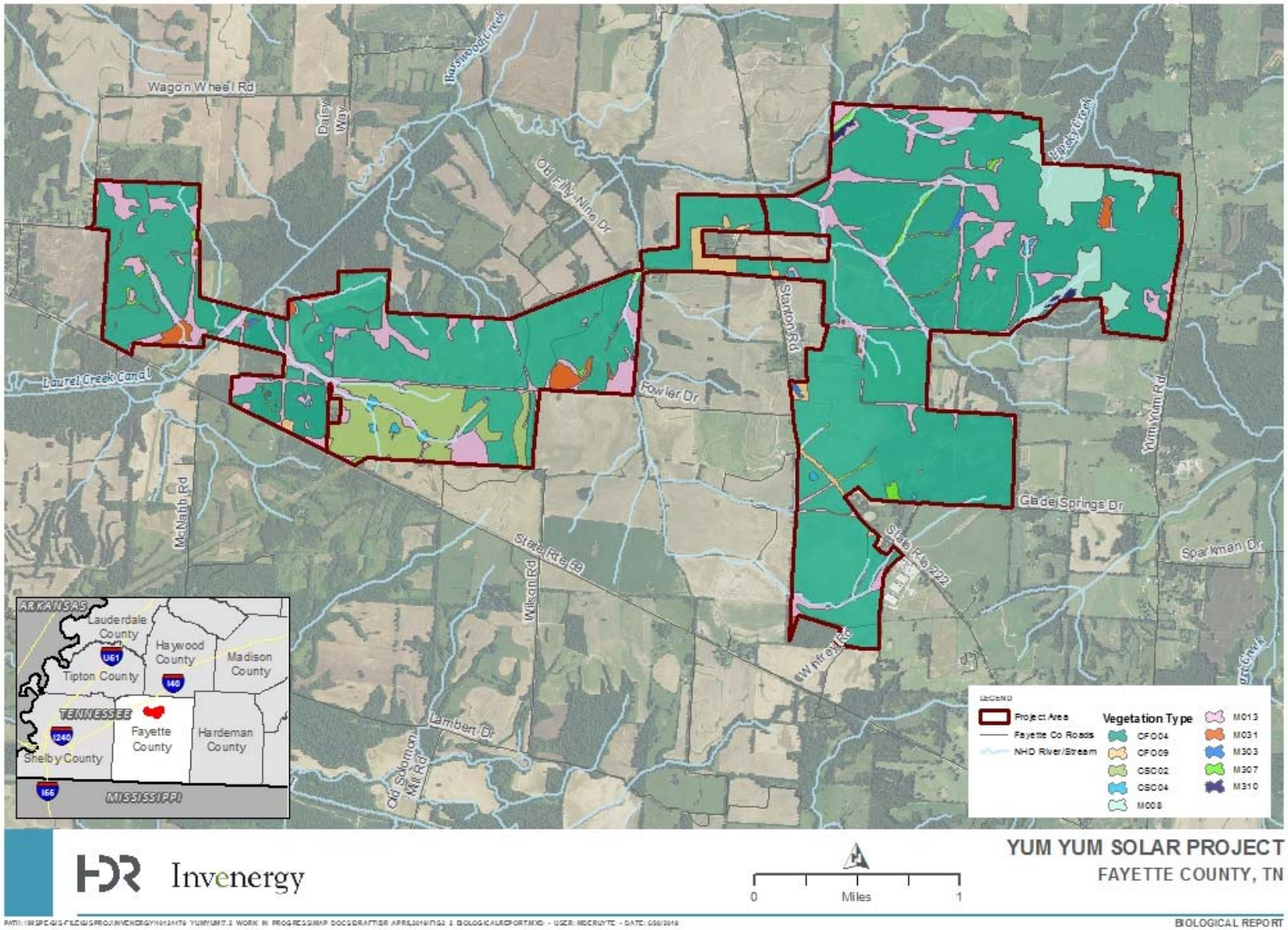

Figure 2. Vegetation Community Types Within the Yum Yum Solar Project Area, Fayette County, Tennessee, 2019.

2.2 Results

2.2.1 Vegetation Communities

The majority of the site is agricultural land containing dirt farm access roads. Agricultural land within the Project Area produces a mix of corn, soybeans, and cotton. Other areas are used as hayfields. Various types of wooded vegetation occur in the Project Area, including narrow wooded riparian corridors and wooded wind breaks within the agricultural areas. There are several stands of deciduous forest within the Project Area. These forested areas are located primarily along field margins and along drainage ways.

Table 2.1 provides a summary of the vegetation community types mapped within the Project Area during the surveys based on the Grossman, et al classification system (Grossman, 1998), followed by detailed descriptions of all communities occupying more than one percent of the Project Area.

Table 2.1. On-Site Vegetation Communities.

Vegetation Community Code	Vegetation Community	Area (acres)	Percentage of Project Area
CFO04	Row and Close Grain Crop Cultural Formation	2106	73%
M013	Eastern North American Ruderal Forest Macrogroup	231	8%
CSC02	Herbaceous Agricultural Vegetation Cultural Subclass	172	6%
M031	Southern Coastal Plain Floodplain Forest Macrogroup	165	6%
M008	Southern Mesic Mixed Broadleaf Forest Macrogroup	112	4%
M307	Southern Rudeal Grassland and Shrubland Macrogroup	35	1%
CFO09	Lawn, Garden, and Recreational Vegetation Cultural Formation	32	1%
CSC04	Agricultural and Developed Aquatic Vegetation Cultural Subclass	11	<1%
M310	Southeastern North American Ruderal Flooded and Swamp Forest Macrogroup	6	<1%
M303	Eastern-Southeastern North American Ruderal Marsh, Wet Meadow & Shrubland Haplogroup	5	<1%

(Grossman, 1998)

<u>CFO04 Row and Close Grain Crop Cultural Formation</u>

Row and Close Grain Crop Cultural Formation is the dominant land use, comprising 73% of the Project Area. Vegetation in these agricultural fields is planted corn (*Zea maize*), soybeans (*Glycine max*), and cotton (*Gossypium hirsutum*). At the time of the survey, agricultural fields were fallow, dominated primarily by bare ground and typical pioneering species such as the non-native annual bluegrass (*Poa annua*), grape hyacinth (*Muscari neglectum*), deadnettles (*Lamium* spp.), and other native forbs such as groundsels (*Packera* spp.) and fleabane (Erigeron spp.) (Photos 1 – 2, Appendix B).

<u>M013 Eastern North American Ruderal Forest Macrogroup</u>

This vegetation community (Photo 4 – 8) characterizes the majority of non-crop/agricultural vegetation types within the Project Area (8 percent).

Typical canopy species observed in this vegetation community within the Project Area included sweetgum (*Liquidambar styraaciflua*), American elm (*Ulmus americana*), southern red oak (*Quercus falcata*), and black oak (*Quercus velutina*). Mid-story species include sweetgum, American elm, white oak (*Quercus alba*), sugar hackberry (*Celtis laevigata*), eastern redcedar (*Juniperus virginiana*), mockernut hickory (*Carya tomentosa*), and southern red oak. Understory, woody vines, and sapling species include sweetgum, American elm, sugar hackberry, poison ivy (*Toxicodendron radicans*), southern red oak, riverbank grape (*Vitis riparia*), and Alabama supplejack (*Berchemia scandens*). Herbaceous cover in this vegetation community typically includes downy yellow violet (*Viola pubescens*), blackberry (*Rubus* spp.), greenbriar (*Smilax* spp.), Virginia creeper (*Parthenocissus quinquefolia*), American field pansy (*Viola bicolor*), wild onion (*Allium* spp.), common bedstraw (*Galium aparine*), common chickweed (*Stellaria media*), and fleabane.

Other uncommon species observed include red mulberry (*Morus rubra*), black cherry (*Prunus serotina*), hophornbeam (*Ostrya virginiana*), willow oak (*Quercus phellos*), water oak (*Quercus nigra*), pignut hickory (*Carya glabra*), red maple (*Acer rubrum*), roughleaf dogwood (*Cornus drummondii*), loblolly pine (*Pinus taeda*), and sycamore (*Platanus occidentalis*). Typical non-native species observed include Japanese honeysuckle (*Lonicera japonica*), Chinese privet (*Ligustrum sinense*), and shepherd's purse (*Capsella bursa-pastoris*).

CSC02 Herbaceous Agricultural Vegetation Cultural Subclass

This vegetation community includes pasture and hayfield cover classes within the Project Area (6 percent). Vegetation in hayfields within the Project Area is dominated by curly dock (*Rumex crispus*), white clover (*Trofolium repens*), foxtail grass (*Setaria pumila*), Johnsongrass (*Sorghum halepense*), tall fescue (*Schedonorus arundinaceus*), broomsedge bluestem (*Andropogon virginicus*), wild onion (*Allium sp.*), buttercup (*Ranunculus* spp.), tiny bluet (*Houstonia pusilla*), and shepherd's purse. (Photo 3)

M031 Southern Coastal Plain Floodplain Forest Macrogroup

This vegetation community (Photos 13 – 14) is uncommon and is associated with riparian and bottomland areas within the Project Area (6 percent). These areas are typically narrow and are comprised of few remnant large oak and hickory trees with a high degree of encroachment by trees common in disturbed areas such as sweetgum, American elm and red maple.

Typical canopy species observed in this vegetation community within the Project Area included sweetgum, green ash, American elm, southern red oak, sycamore, red maple, mockernut hickory, white oak, shellbark hickory (*Carya laciniosa*), and willow oak. Mid-story species include sweetgum, American elm, sugar hackberry, mockernut hickory, black oak, and southern red oak. Understory, woody vines, and sapling species include American elm, red buckeye (*Aesculus pavia*), sugar maple, Devil's walkingstick, possumhaw, poison ivy (*Toxicodendron radicans*), and riverbank grape. Herbaceous cover in this vegetation community typically includes downy yellow violet, common blue violet (*Viola sororia*), inland woodoats, sedges, greenbriar, Virginia creeper, American field pansy, wild onion, common bedstraw, common chickweed, and purple deadnettle (*Lamium purpurea*).

Other uncommon species observed include spicebush (*Lindera benzoin*), honey locust (*Gleditsia tricanthos*), river birch (*Betula nigra*), black willow (*Salix nigra*), and mayapple. Typical non-native species observed include Japanese honeysuckle (*Lonicera japonica*), Chinese privet (*Ligustrum sinense*), bamboo (*Phyllostachys aurea*), and shepherd's purse.

M008 Southern Mesic Mixed Broadleaf Forest Macrogroup

This vegetation community (Photos 9 – 12) is uncommon within the Project Area (4 percent), but it represents the likely forest type present prior to historical and ongoing disturbance of the forest areas.

Typical canopy species observed in this vegetation community within the Project Area included mockernut hickory, white oak, shellbark hickory (*Carya laciniosa*), shagbark hickory (*Carya ovata*), black cherry, willow oak, southern red oak, and black oak. Mid-story species included mockernut hickory, shagbark hickory, southern red oak, sweetgum, American elm, white oak, black gum (*Nyssa sylvatica*), black cherry, and eastern redcedar. Understory, woody vines, and sapling species included southern red oak, mockernut hickory, sweetgum, water hickory (*Carya aquatica*), white oak, American elm, poison ivy, riverbank grape, possumhaw (*Ilex decidua*), devil's walkingstick (*Aralia spinosa*), and Alabama supplejack (*Berchemia scandens*). Herbaceous cover in this vegetation community typically includes downy yellow violet (*Viola pubescens*), inland woodoats (*Chasmanthium latifolium*), longleaf woodoats (*Chasmanthium sessiliflorum*), Christmas fern (*Polystichum acrostichoides*), sedge (*Carex* spp.), mayapple (*Podophyllum peltatum*), greenbriar, Virginia creeper, and wild onion.

Other uncommon species observed include green ash (*Fraxinus pennsylvanica*), yellow poplar (*Liriodendron tulipera*), rusty blackhaw (*Viburnum rufidulum*). Non-native species were present but not prevalent and included Japanese honeysuckle (*Lonicera japonica*) and Chinese privet (*Ligustrum sinense*).

2.2.2 Non-native and invasive plants

No federal-noxious weeds (US Department of Agriculture, Natural Resources Conservation Service, 2012) were observed, but many non-native invasive plant species were observed throughout the Project Area. In addition to tall fescue, invasive species observed on site include Chinese privet *(Ligustrum sinese),* mimosa (*Albizia julibrissin*)*,* Nepalese browntop *(Microstegium vimineum),* Japanese honeysuckle (*Lonicera japonica*)*,* bamboo *(Phyllostachys sp.)* (Photo 15) and multiflora rose (*Rosa multiflora*). These species were most often found in ruderal forested areas, along field edges, and in areas prone to disturbance. Where present, these species represented less than 5 percent of the plant community. During field surveys, invasive plants were found in both forest and herbaceous vegetation areas.

2.2.3 Federal- and state-listed threatened and endangered plants

According to the USFWS IPaC database, no federally listed plants occur within Fayette County, TN (United States Fish and Wildlife Service, 2019). Also, the Tennessee Natural Heritage Database has no records of any federally listed plants within five miles of the Project Area. **Table 2.2** lists state-listed endangered and threatened plant species that may occur within Fayette County, TN (Tennessee Department of Environment & Conservation, 2019). Specific

locations of known records of occurrence are not available, but likelihood of species occurrence can be estimated by matching species habitat requirements with land cover types from **Error! Reference source not found.**

Table 2.2. State-listed Plant Species in Fayette County, TN.

Type	Category	Scientific Name	Common Name	State Status	Habitat	Likelihood of Occurrence
Vascular Plant	Flowering Plant	*Bulbostylis ciliatifolia var. coarctata*	Capillary Hairsedge	E	Upland Pine-Oak Woods	Unlikely; habitat not present
Vascular Plant	Flowering Plant	*Listera australis*	Southern Twayblade	E	Wet-Mesic Woods	Potential; M310 community
Vascular Plant	Flowering Plant	*Symphyotrichum praealtum*	Willow Aster	E	Moist Prairies And Marshes	Potential; M303 community
Vascular Plant	Flowering Plant	*Heteranthera limosa*	Blue Mud-plantain	T	Mud Flats	Unlikely; habitat not present
Vascular Plant	Flowering Plant	*Iris fulva*	Copper Iris	T	Bottomlands	Potential; M031 community

Source: Tennessee Department of Environment & Conservation, Rare Species by County, Retrieved May 1, 2019.
E = Endangered, T = Threatened

No federally or state-listed plant species were observed during the pedestrian survey. No pine-oak woods were observed within the Project Area, so the capillary hairsedge is unlikely to occur in the Project Area. Mud flats could occur when ponds and perennial or intermittent streams within the Project Area drawdown, exposing mud areas. However, these exposed mud areas would be ephemeral and cover small areas; therefore, mud flat habitat that may occur in the Project Area is unlikely to provide habitat for the blue mud-plantain. Approximately seven acres of marsh have been mapped, accounting for less than one percent of the Project Area. Most of the marsh areas are associated with streams and drainages within agricultural fields. In addition to small areas of habitat in the Project Area, the presence of marsh species is unlikely due to the predominance of highly managed land use. Mesic woods and bottomland forest do occur in the Project Area; therefore, southern twayblade and copper iris could potentially occur in the forested regions of the Project Area.

2.2.4 Other plants of conservation concern

In addition to state-listed species, the Tennessee Department of Environment & Conservation also identify other plant species of special concern, which are species uncommon in Tennessee, or have unique or highly specific habitat requirements or scientific value and therefore require careful monitoring of their status. **Table 2.3** lists plant species of special concern that may occur within Fayette County, Tennessee (Tennessee Department of Environment & Conservation, 2019).

Table 2.3. Plant Species of Special Concern in Fayette County, TN.

Type	Category	Scientific Name	Common Name	State Status	Habitat	**Likelihood of Occurrence**
Vascular Plant	Flowering Plant	*Ceratophyllum echinatum*	Prickly Hornwort	S	Lakes, ponds, slow streams, and swamp or marsh pools. It often thrives in naturally disturbed wetlands, such as beaver ponds.	Potential: M310 and M303 communities
Vascular Plant	Flowering Plant	*Quercus margarettiae*	Sand Post Oak	S	Sandy hills	Unlikely; habitat not present
Vascular Plant	Flowering Plant	*Heteranthera multiflora*	Multiflowered Mud-plantain	S	Shallow water, mud flats	Unlikely; habitat not present
Vascular Plant	Flowering Plant	*Festuca paradoxa*	Cluster Fescue	S	Wet woods and prairie	Potential; M008 community
Vascular Plant	Flowering Plant	*Juncus brachyphyllus*	Shortleaf Rush	S	Open moist, sandy ground	Unlikely; habitat not present
Vascular Plant	Flowering Plant	*Penstemon tubiflorus*	White-wand Beardtongue	S	Open prairies to deciduous woodlands, disturbed areas, along railroads, rocky glades.	Potential; CSC04 community
Vascular Plant	Flowering Plant	*Cyperus plukenetii*	Plukenet's Flatsedge	S	Sandy barrens	Unlikely; habitat not present

Source: Tennessee Department of Environment & Conservation, Rare Species by County, Retrieved May 1, 2019.
S = Species of special concern

No plant species of special concern were observed during the pedestrian survey. Mud flat habitat that may occur in the Project Area is unlikely to provide habitat for the multiflowered mud-plantain. The majority of the soils (99%) within the Project Area are silty loams; no sandy hills, prairies, or barrens occur within the Project Area; therefore, Plukenet’s flatsedge, shortleaf rush, and sand post oak are unlikely to occur in the Project Area. Mesic deciduous woodlands, ponds, streams, and disturbed wetlands and uplands do occur in the Project Area; therefore, prickly hornwort, cluster fescue, and white-wand beardtongue potentially occur in the mesic forest or disturbed marsh regions of the Project Area.

No pristine forest areas or other rare or unique vegetation communities were identified during the pedestrian survey.

3.0 Wildlife Survey

3.1 Methods

Following TVA guidelines (Tennessee Valley Authority, 2017), Yum Yum Solar referenced the USFWS IPaC database (United States Fish and Wildlife Service, 2019) for federally threatened

and endangered wildlife in Fayette County, and the TVA Heritage Database (Tennessee Valley Authority, 2019) for state-listed wildlife within a 3-mile buffer of and including the Project Area. Results are included in Appendix A.

A pedestrian survey of biological resources in the Project Area was conducted from November 11-16, 2018, January 12-18, 2019, March 12-13, 2019 and April 10-11, 2019. The survey focused on species observed and potential wildlife habitats within the Project Area. Biologists conducted a meander search of the Project Area on foot at a casual pace, concurrently with the Vegetation Field Survey described in Section 2.1.

3.2 Results

3.2.1 Wildlife in the Project Area

Table 3.1 presents a list of species that were either directly observed within the Project Area, or whose evidence (e.g. tracks, scat, remains) was noted during the field survey.

Table 3.1. Wildlife Species Observed in Project Area.

Species Observed (Common Name)	Notes / Habitat Where Observed
Mammals	
White-tailed deer	Tracks noted in mud throughout. Several individuals observed in cornfield in northwest portion of site.
Coyote	Scat observed throughout site.
Raccoon	Tracks noted in mud throughout site.
Gray squirrel	Individuals observed, and additional individuals heard in wooded of site. Mixed deciduous woodland habitat.
Eastern cottontail rabbit	Observed throughout site.
Virginia opossum	Tracks noted in mud throughout site.
Amphibians	
Spring peeper	Large numbers heard in emergent and forested wetlands.
Birds	
House finch	Observed near residential developed areas of site.
European starling	Observed near residential developed areas of site.
Lark sparrow	Observed in field edges.
Eastern meadowlark	Observed in fields and field edges.
Cliff swallow	Observed in open areas of site.
Wild turkey	Observed in forested areas and field edges.
Eastern bluebird	Observed in forested areas and field edges.
Cooper’s hawk	Observed in forested areas and field edges.
Field sparrow	Observed in forested areas and field edges.
Brown-headed cowbird	Observed in forested areas and field edges.
American crow	Observed in forested areas and field edges.
Red-tailed hawk	Observed soaring above site.
Black vulture	Observed soaring above site.
Turkey vulture	Observed soaring above site.

Species Observed (Common Name)	Notes / Habitat Where Observed
Carolina wren	Observed in wooded and brush areas of site.
Northern cardinal	Observed in wooded and brush areas of site.
Chipping sparrow	Observed in wooded and brush areas of site.
White-throated sparrow	Observed in wooded and brush areas of site.
Blue jay	Observed in wooded and brush areas of site.
Northern mockingbird	Observed in wooded and brush areas of site.
White-eyed vireo	Observed in wooded and brush areas of site.
Song sparrow	Observed in wooded and brush areas of site.
Northern parula	Observed in wooded and brush areas of site.
Tufted titmouse	Observed in wooded and brush areas of site.
Blue-gray gnatcatcher	Observed in wooded and brush areas of site.
Carolina chickadee	Observed in wooded and brush areas of site.
Black and white warbler	Observed in wooded and brush areas of site.
Eastern phoebe	Observed in wooded and brush areas of site.
Slate-colored junco	Observed in wooded and brush areas of site.
American robin	Observed in wooded and brush areas of site.
Eastern towhee	Observed in wooded and brush areas of site.
Mourning dove	Observed in wooded and brush areas of site.
Indigo bunting	Observed in wooded and brush areas of site.
Golden-crowned kinglet	Observed in wooded and brush areas of site.
Great blue heron	Observed in wetland areas and along rivers.
Red-bellied woodpecker	Observed in bottomland forests.
Downy woodpecker	Observed in bottomland forests.
Hairy woodpecker	Observed in bottomland forests.
Prothonotary warbler	Observed in bottomland forests.
Red-eyed vireo	Observed in bottomland forests.
Insects	
Red admiral	Observed near nectar plants scattered throughout site.
Painted lady	Observed near nectar plants scattered throughout site.
Monarch	Observed near nectar plants scattered throughout site.
E. tiger swallowtail	Observed near nectar plants scattered throughout site.
Crane flies	Observed throughout site.
American bumblebee	Observed near nectar plants scattered throughout site.

3.2.2 Federally- and State-Listed Wildlife

Wildlife species listed as endangered or threatened are protected under the federal Endangered Species Act (ESA) (1973). The Tennessee Wildlife Resources Commission lists additional species as endangered or threatened pursuant to the Tennessee Code Annotated, Sections 70-8-105 and 70-8-107. Species listed as endangered or threatened under the federal ESA are

also state-listed in Tennessee. Yum Yum Solar's assessment also considered species protected under the Bald and Golden Eagle Protection Act (BGEPA) and the Migratory Bird Treaty Act (MBTA). The IPaC search identified two federally listed species – Indiana bat and northern long-eared bat – as having the potential to occur within the Project Area (USFWS 2019). Based on the TVA heritage database results, there are no known occurrences of these species within a 3-mile buffer of the Project Area. There are no USFWS identified critical habitats for these species within the Project Area (U.S. Fish & Wildlife Service, 2008). **Table 3.2** provides a summary of the federally and state-listed wildlife species that were identified in the IPaC report and TVA Heritage Database search for the Project Area.

Table 3.2. State and Federally-listed wildlife, status, preferred habitat, and presence of habitat in the Yum Yum Solar Project Area, Fayette County, Tennessee.

Common Name	Scientific Name	Status[1]	Preferred Habitat	Potential Habitat in the Project Area
Indiana bat	*Myotis sodalis*	FE	Indiana bats spend winter hibernating in caves and mines, called hibernacula. They use areas in various sized caves or mines with constant temperatures, high humidity, and no air currents. Within hibernacula, surveyors find them hibernating most often in small crevices or cracks, often with only the nose and ears visible. Summer foraging habitat includes small to medium river and stream corridors with well-developed riparian woods; woodlots within 1 to 3 miles of small to medium rivers and streams; and upland forests. Suitable summer roosting habitat is defined by the USFWS as suitable drinking and foraging areas with Potential Roost Trees (PRTs), which are trees with exfoliating bark, cracks, crevices or cavities that are >5" diameter at breast height (DBH).	Yes
Northern long-eared bat	*Myotis septrentrionalis*	FT	Northern long-eared bats spend winter hibernating in caves and mines, called hibernacula. They use areas in various sized caves or mines with constant temperatures, high humidity, and no air currents. Within hibernacula, surveyors find them hibernating most often in small crevices or cracks, often with only the nose and ears visible. Summer foraging habitat includes small to medium river and stream corridors with well-developed riparian woods; woodlots within 1 to 3 miles of small to medium rivers and streams; and upland forests. Suitable summer roosting habitat is defined by the USFWS as suitable drinking and foraging areas with PRTs, which are trees with exfoliating bark, cracks, crevices or cavities that are >3" DBH.	Yes

Sources: [Tennessee Department of Environment & Conservation, Accessed 5/1/2019. http://environment-online.state.tn.us:8080/pls/enf_reports/f?p=9014:3:0 and USFWS IPaC species list for Fayette County, Tennessee, obtained May 1, 2019.

[1] FE = Federal-Endangered, FT = Federal-Threatened

INDIANA BAT

The federally endangered Indiana bat (*Myotis sodalis*) may occur within Fayette County, Tennessee (USFWS, 2012). A full Phase I Project Screening habitat assessment in accordance with the 2018 “Range-wide Indiana Bat Summer Survey Guidelines, USFWS” (USFWS, 2018a) was conducted for both the Indiana and northern long-eared bat on March 27-29, 2019 and the results are presented in a separate bat habitat report (Copperhead, 2019). Suitable winter habitat is restricted to hibernacula, or caves and cave-like structures, such as abandoned mines and railroad tunnels. No known hibernacula are located within 20 miles of the Project Area. The nearest known hibernacula are located approximately 45 miles northwest from the Project Area. Indiana bats forage over small to medium stream corridors with riparian forests and woodlots located within a few miles of riverine areas. Suitable summer roosting habitat consists of drinking and foraging areas with PRTs exhibiting exfoliating bark, cracks, crevices or cavities that are greater than 5 inches DBH. Summer roosting and foraging habitat within the Project Area includes woody wetlands and forests (Figure 2).

Forest areas with potential roost trees, such as shellbark hickory, shagbark hickory, and white oak were observed during the pedestrian survey (Photos 16 – 20). Indiana bat PRTs were identified in 15 woodlots, totaling 477 acres (Copperhead, 2019). Several water features such as ponds and creeks were also observed within the Project Area, which provide foraging habitat. A full Phase I Project Screening habitat assessment in accordance with the 2018 “Range-wide Indiana Bat Summer Survey Guidelines, USFWS” (USFWS, 2018a) was conducted for the Project March 27-29, 2019 and results are presented in a bat habitat report (Copperhead, 2019).

NORTHERN LONG-EARED BAT

The federally threatened northern long-eared bat (*Myotis septentrionalis*) may also occur within Fayette County, Tennessee (USFWS, 2012). Summer roosting habitat for the northern long-eared bat consists of drinking and foraging areas with potential roost trees exhibiting exfoliating bark, cracks, crevices or cavities that are greater than 3 inches DBH. Northern long-eared bat suitable summer roosting habitat may also include human-made structures, such as buildings, barns, and bat houses. Northern long-eared bats forage over small to medium stream corridors with riparian forests and woodlots located within a few miles of riverine areas. No known hibernacula are located within 20 miles of the Project Area. The nearest known hibernacula for northern long-eared bat are located approximately 96 miles from the Project Area.

Forest areas with potential roost trees, such as shellbark hickory, shagbark hickory, and white oak were observed during the pedestrian survey (Photos 16 – 20). Northern long-eared bat PRTs were observed in 68 woodlots, totaling 802 acres (Copperhead, 2019). Several water features such as ponds and creeks were also observed within the Project Area, which provide foraging habitat. A full Phase I Project Screening habitat assessment in accordance with the 2018 “Range-wide Indiana Bat Summer Survey Guidelines, USFWS” (USFWS, 2018a) was conducted for the Project March 27-29, 2019 and results are presented in a bat habitat report (Copperhead, 2019).

3.2.3. Bald and Golden Eagle Protection Act

EAGLES

Both bald and golden eagles are protected by the Bald and Golden Eagle Protection Act of 1940 (BGEPA, 16 U.S.C. 668-668d). These species are also protected under the Migratory Bird Treaty Act (MBTA) (Section 3.2.4). Bald and golden eagles have been observed within 10 miles of the Project Area in the Hatchie National Wildlife Refuge (Figure 3). Bald eagles typically utilize forested areas adjacent to large bodies of water for nesting habitat. Tall, mature coniferous or deciduous trees that afford a wide view of the surroundings are used as nest and roost trees. Bald eagles typically avoid heavily developed areas. Suitable summer nesting habitat for bald eagles generally consists of prominent trees along riparian corridors on large bodies of water. Winter habitat in Tennessee includes reservoirs and large rivers. Bald eagles are known to nest in Tennessee, with 175 nesting pairs as of 2012 (Tennessee Wildlife Resources Agency, 2019). Although large trees which may meet the needs for a nest or roost site occur within the Project Area, no large bodies of water are located in the Project Area or within 10 miles of the Project Area. Therefore, bald eagles are unlikely to nest in the Project Area.

Golden eagle nesting habitat includes river cliffsides and bluffs. However, in the vicinity of the Project Area, the golden eagle occurs as a rare winter resident. Wintering habitat includes forested area with open habitats for foraging. Sightings of the golden eagle have been recorded at natural areas and wildlife refuges in southwestern Tennessee, in the general vicinity of the Project Area, the nearest being in the Hatchie National Wildlife Refuge, 10 miles northeast of the Project Area (eBird, 2018). The Project Area encompasses suitable winter roosting and foraging habitat; therefore, the golden eagle could potentially occur in the Project Area.

3.2.4. Migratory Bird Treaty Act

MIGRATORY BIRDS OF CONSERVATION CONCERN

The Project Area is located within the Bird Conservation Region 27, Southeastern Coastal Plain (Bird Studies Canada and NABCI, 2014). There are 53 species of conservation concern in this region including songbirds, shorebirds, woodpeckers, owls, and raptors (U.S. Fish & Wildlife Service, 2008). Based on the IPaC database, none of the 53 birds of conservation concern are expected to occur in the Project Area. However, six of the 53 species have been observed in Fayette County as part of the Breeding Bird Survey or Christmas Bird Counts. The migratory bird list in **Table 3.3** is derived from the USFWS Birds of Conservation Concern identified for BCR 27 and the migratory birds identified in the Breeding Bird Survey and Christmas Bird Counts in Fayette County, Tennessee.

Table 3.3. Birds of Conservation Concern and Migratory Bird List.

Common Name	Scientific Name	General Habitat Description	Potential Habitat in the Project Area?
Breeding Season Migrants (may occur only during the breeding season)			
Chuck-will's-widow	*Antrostomus carolinensis*	Pine, oak-hickory, and other forests	Yes
Kentucky Warbler	*Oporornis formosus*	Deep shaded woods with dense, humid thickets; bottomlands near creeks and rivers, ravines in upland deciduous woods, and edges of swamp	Yes
Prothonotary Warbler	*Protonotaria citrea*	Flooded bottomland forests, wooded swamps, and forests near lakes and streams	Yes
Whip-poor-will	*Antrostomus vociferus*	Dry deciduous or evergreen-deciduous forest with little or no underbrush, close to open areas	Yes
Wood Thrush	*Hylocichla mustelina*	Mature deciduous and mixed forests; most commonly those with American beech, sweet gum, red maple, black gum, eastern hemlock, flowering dogwood, American hornbeam, oaks, or pines	Yes
Resident Species (may occur year-round)			
Red-headed Woodpecker	*Melanerpes erythrocephalus*	Deciduous woodlands with oak or beech, groves of dead or dying trees, river bottoms, burned areas, recent clearings, beaver swamps, orchards, parks, farmland, grasslands with scattered trees, forest edges, and roadsides	Yes

Source: Range and general habitat information obtained from Cornell Lab of Ornithology at https://www.birds.cornell.edu/home/ Accessed on May 1, 2019 and The Sibley's Guide to Birds, Second Edition

Oak – hickory forest, bottomland forest and woodland areas within the Project Area provide potential breeding habitat for many of these species including chuck-will's-widow, eastern whip-poor-will, prothonotary warbler, red-headed woodpecker, and wood thrush.

BREEDING BIRD SURVEY

The Moscow Breeding Bird Survey Route occurs 0.7 miles east of the Project Area. Figure 3 shows the locations of the BBS routes nearest to the Project Area. Several species of birds

including blue jays, cardinals, crows, indigo buntings, mockingbirds, and mourning dove have been commonly observed breeding in the vicinity and the habitat types used by these species include cropland, forest, and wetlands. Six species of conservation concern have been observed along this route, including the chuck-will's-widow, Kentucky warbler, prothonotary warbler, red-headed woodpecker, whip-poor-will and wood thrush. These species occur typically in forest and woodland areas.

CHRISTMAS BIRD COUNTS

The nearest Christmas Bird Count route is the Fayette County count, which encompasses a 5-mile radius centered west of the Fayette County airport, approximately 6.5 miles southeast of the Project Area (Figure 3). Species that have been commonly observed on this route include American crow, Canada goose, cedar waxwing, dark-eyed junco, eastern meadowlark, mourning dove, northern cardinal, turkey vulture, white-throated sparrow, and yellow-rumped warbler. The red-headed woodpecker, a forest and forest edge species, has been recorded on this count.

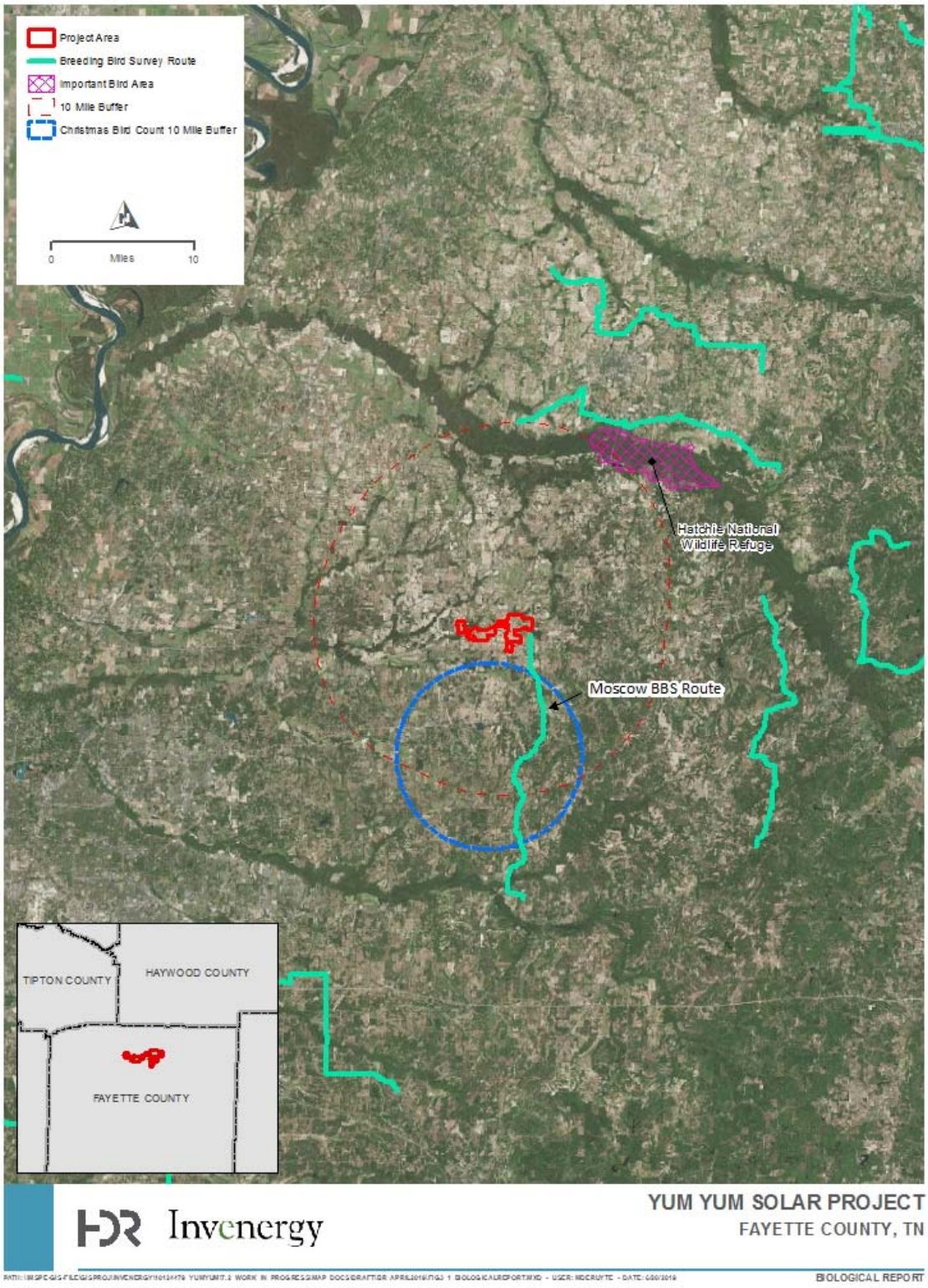

Figure 3. Breeding Bird Survey Routes, Christmas Bird Count Survey Routes, and Important Bird Area within 10 miles of the Yum Yum Solar Project Area, Fayette County, Tennessee, 2019.

3.2.5. Other Wildlife Species of Concern

The TVA Heritage Database (TVA 2019) and Tennessee Department of Environment & Conservation was also consulted to identify other state species deemed in need of management having the potential to occur in the Project Area. **Table 3.4** provides a summary of other wildlife species of concern.

Table 3.4. Other wildlife species of concern potentially occurring in the Project Area.

Common Name	Scientific Name	Status[1]	Preferred Habitat	Potential habitat present in Project Area?
Southeastern Shrew	*Sorex longirostris*	D	Various habitats including wet meadows, damp woods, and uplands; statewide.	Yes
Meadow Jumping Mouse	*Zapus hudsonius*	D	Open grassy fields; often abundant in thick vegetation near water bodies; statewide.	Yes
Southern Bog Lemming	*Synaptomys cooperi*	D	The grassy openings and edges of forests, especially where sedges, ferns, and shrubs grow and when the soil is loose and crumbly.	Yes
Northern Madtom	*Noturus stigmosus*	D	Freshwater creeks with swift currents along sand, silt, or rocky substrates	No

[1] D = Deemed in need of management

The general habitat types which support these other species of conservation concern are present within the Project Area. Due to the heavily managed land use in the majority of the Project Area, the species which utilize grassy or marshy areas – meadow jumping mouse and southern bog lemming – may not occur within the Project Area. Several large patches of relatively undisturbed forest may support the southeast shrew. Northern madtom is a type of freshwater catfish that have been found throughout the midwestern United States. The fish prefer large creeks and small rivers with moderate current and clear to turbid water, where they favor open areas with only some cover from vegetation or debris and avoid silty conditions. Sand and mud bottoms and streams with swift rocky riffles are preferred. This fish is not expected to be present in the Project Area due to the lack of stream habitat fitting the favored conditions of this species.

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Appendix A
IPaC Results

IPaC **U.S. Fish & Wildlife Service**

IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

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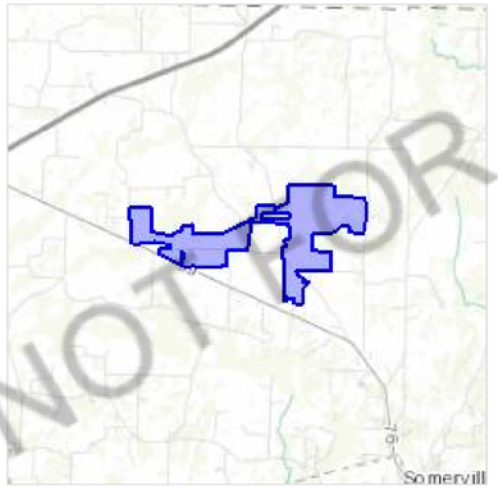
Location

Fayette County, Tennessee



Local office

Tennessee Ecological Services Field Office

(931) 528-6481
(931) 528-7075

446 Neal Street
Cookeville, TN 38501-4027

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population, even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species[1] and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries[2]).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

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1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information.
2. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

Mammals

NAME	STATUS

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Indiana Bat Myotis sodalis — Endangered
There is **final** critical habitat for this species. Your location is outside the critical habitat.
https://ecos.fws.gov/ecp/species/5949

Northern Long-eared Bat Myotis septentrionalis — Threatened
No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/9045

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

THERE ARE NO CRITICAL HABITATS AT THIS LOCATION.

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.

Additional information can be found using the following links:

- Birds of Conservation Concern http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php
- Measures for avoiding and minimizing impacts to birds http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php
- Nationwide conservation measures for birds http://www.fws.gov/migratorybirds/pdf/management/nationwidestandardconservationmeasures.pdf

THERE ARE NO MIGRATORY BIRDS OF CONSERVATION CONCERN EXPECTED TO OCCUR AT THIS LOCATION.

Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and

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avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures and/or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the migratory birds potentially occurring in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the AKN Phenology Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets .

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering, migrating or present year-round in my project area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may refer to the following resources: The Cornell Lab of Ornithology All About Birds Bird Guide, or (if you are unsuccessful in locating the bird of interest there), the Cornell Lab of Ornithology Neotropical Birds guide. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird

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impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

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Facilities

National Wildlife Refuge lands

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS AT THIS LOCATION.

Fish hatcheries

THERE ARE NO FISH HATCHERIES AT THIS LOCATION.

Wetlands in the National Wetlands Inventory

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

This location overlaps the following wetlands:

FRESHWATER EMERGENT WETLAND

- PEM1A
- PEM1Fh

FRESHWATER FORESTED/SHRUB WETLAND

- PFO1A
- PFO1C
- PFO1F
- PFO1Fh

FRESHWATER POND

- PUBHh

RIVERINE

- R5UBH
- R2UBHx
- R4SBC

A full description for each wetland code can be found at the National Wetlands Inventory website

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

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Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

NOT FOR CONSULTATION

Appendix B
Photo Log

Representative Site Photographs

Biological Field Survey – April 10 – 11, 2019

Photo 1. Representative view of fallow cropland in the study area.

Photo 2. Representative view of fallow cropland in the study area.

Photo 3. Representative view of hayfields in the Project Area.

Photo 4. Representative view of M031 Southern Coastal Plain Floodplain Forest.

Photo 5. Representative view of M031 Southern Coastal Plain Floodplain Forest.

Photo 6. Representative view of M031 Southern Coastal Plain Floodplain Forest.

Photo 7. Representative view of M031 Southern Coastal Plain Floodplain Forest.

Photo 8. Representative view of wooded area between a fallow crop field and Highway 59.

Photo 9. Representative view of M031 Southern Coastal Plain Floodplain Forest.

Photo 10. Representative view of M031 Southern Coastal Plain Floodplain Forest.

Photo 11. Representative view of M008 Southern Mesic, Mixed Broadleaf Forest.

Photo 12. Representative view of S M008 Southern Mesic, Mixed Broadleaf Forest.

Photo 13. Representative view of M031 Southern Coastal Plain Floodplain Forest.

Photo 14. Representative view of M008 Southern Mesic, Mixed Broadleaf Forest.

Photo 15. View of bamboo thicket near culvert in west-central part of Project Area.

Photo 16. View of potential roost tree RT-1 (shellbark hickory).

Photo 17. View of potential roost tree in a cluster (shagbark hickory).

Photo 18. View of potential roost tree in a cluster (white oak).

Photo 19. View of potential roost tree in a cluster (shagbark hickory).

Photo 20. View of suitable roosting/nesting culvert on TN-222, at edge of Project Area.

Appendix C
Field Notes

~~2013 x2 RT 58b (Midland Airport)~~

April 10, 2019 – Yum Yum Solar

1000 @ Oak Grove Gin / Winfrey Rd

Birds: BLVU NOMO
CARW
HOFI
NOCA
EUST
CHSP
WTSP
BLJA
PEABL
HAWO

1020 Fowler Rd

WEVI GBHE
RBWO
FISP
SOSP
WTSP
NOPA (N. parula)
TUTI
BGGN
EAME
CACH
RTHA
Mag Warbl?
BHCO
EAPH
LASP
DEJU (slate colored?)
BWNA

Monarch
E. tiger swallowtail

Along road
Ligustrum sinense along road
Pine, e. redcedar, fleabane
Hackberry, poison ivy

around corner @ culvert
buckeye shrub

Crane flies
AM bumblebee

Rite in the Rain

Yum Yum April 10

1430 N West end
AMCR

10F-1 Forest Point (Riparian)

Unid hummingbird

Canopy - 35% cover

Sweetgum - 17.5 dbh
~~Maple?~~ Am. elm - 18.3 dbh
e. redcedar - 30 dbh (1%)

Midstory 20%
Sweetgum - 6, 8, 4, 5
white oak - 7 dbh
Mockernut hickory - 7 dbh
e. redcedar - 7

redoak 7,8

Understory/Shrub/sapling 60%
Am. elm - 1,
Sweetgum - 2,
Sugarberry - <1, <1
S. red oak - <1
Ligustrum - <1

10% leaf litter

90% Herbaceous layer

downy yellow violet
Viola pubescens

Rubus sp.
green briar
V. creeper

J. honeysuckle?
L. japonica

Am. lady butterfly

wild onion
poison ivy

Viola bicolor
am. field pansy

opossum tracks

AMRO

wandering observation of
Game forest patch

willow oak - 20 dbh, more small
black cherry (few) - 18 12-15
cedar elm (sapling) - patch of 80% sapling layer
red oak (few in canopy)
giant water oak - 46 dbh

black locust

EATO

thicket of red mulberry (or paper mulberry?)

isolated patches mostly sweetgum + hackberry with saplings of the same + winged elm, blacklocust, red mulberry

TUVU — some willow

CLSW

MODO

Fowler road
- Cooper's hawk

roadside/edge
- ligustrum
- hackberry - 6-10
- Am. Elm (mid) - 15-20
- Redoak South (mature) - 20-30
- Pine - 15-20
- White oak - 20-30
- E. red cedar - 6-15
- Sweetgum - 12-15
- willow oak (mature) - 20-30
- Red buckeye (understory) -

10F-2

Canopy (but habitat) - 80%
- Mockernut hickory - double bole 35+
- Sweetgum - 14-17 dbh
- White oak - 45-50 dbh
- Shell bark hickory -
- green ash - 12 dbh

Midstory 30%
- Hackberry - 25 dbh
- Mockernut - 14 dbh
- Red oak - 6-8 dbh
- Sweetgum - 10-12 dbh

* bamboo at edge of plot radius

saplings of canopy + midstory

Understory 20%
- woody vine
- Vitis riparia
- hazelnut 5-10%
- Am. elm
- white oak
- R. buckeye
- boxelder

Herbaceous (see 10F-1)
- Chasmanthium sp.
- wild onion
- poison ivy
- yellow violet
- no rubus here

Meandering - island west of pond
little bluestem field (hay) surrounding islad
persimmon ↓
pine (slash?) buttercup
e. redcedar tiny bluet
dogwood shepherd's purse

Fencerow by pond
N. red oak - Q. rubra 20-60 dbh - buttressed
Willow oak - 60 dbh
Sycamore - 15-20 dbh
Vitis
A. elm - 10-25 dbh
black cherry - 8-10
Ligustrum

10F-3
Canopy = 90%
Black cherry (mult-bole) = 10-12/bole 40-45 total
Am. elm (single bole) = 12
no hickories or potential roost trees S. red oak
↳ 12-14 → 8-12 dbh
gray squirrel

Midstory % cover = 15%
Am. elm 4-10
Paper birch - 10
Ostrya virginiana - hophorn beam 10 dbh
C. laevigata - 8 dbh
Understory (sapling) = 10%
Am. elm

no woody vines
Herbaceous (carpet) - 95%
Stellaria media - common chickweed 5%
Gallium aparine - bedstraw 5%
larger red oaks around edges 25-35 dbh
Unknown - no flowers - most of herb layer 95%
5% litter
Erigonum - fleabane

On way to 10F-4

shagbark hickory - 10 dbh
- 25 dbh

Cluster of shagbark hickory water hickory with slonghing bark ≥ 10 dbh

water hickory - 27 dbh
- 10 dbh

white oak 100+ dbh - platy sloughing bark starts @ a 20'

wood violets V. sororia
mayapple

10F-4

Canopy = 65%
white oak = 30 dbh
Red oak = 25 dbh
W. oak (Q pellos)

Mid Story = 40%
Am. elm - 10

Understory = 15%
hickory sapling
Am. elm

Herbaceous
Lonicera japonica 5%
Carex 5%
C. sessiloflorum 2%

Rite in the Rain

Apr 11 2019 Yum Yum

0715 NE Corner

WITU	TUTI	Unkn. warbler	RBWO
NOPA	BLJA	CARW	~~HAWO~~ DOWO
FISP	NOMO	CACH	AMRO
EATO	BHCO	BGGN	NOCA
			INBU

11F-1

Canopy 90%

* Mockernut hickory 12 dbh 12 13, 14
N Red oak 16 dbh
S Red oak 21 dbh
White oak 20 dbh

Sycamores in low areas 12-13 dbh

Mid Story 40%

* Mockernut 5-6
yellow poplar 4 dbh - 5
white oak
* Am. elm 4-5

Cluster of W. oak ~~[illegible]~~ west of 11F-1 avg dbh 15"

Understory 40%
* Mockernut hickory
* Am. elm
Rusty blackhaw
Devil's walking stick (Aralia spinosa)
White oak
Redbud

winged elm
e. redcedar

Herbaceous 10%
poison ivy
greenbriar
V. creeper
May apple
J. honeysuckle
Carex sp.

Making a counter clockwise wander in NE corner

isolated patch – sweetgum *
hackberry *
Sugar maple
j. honeysuckle

WTSP ascending ~~sa~~ seperate buzz (not NOPA)
WEVI sing-song (see saw) whistle
AMCR
LASP
GCKI

thicker patch at stream headwater

sap * mockernut hickory 20-30
sap water oak 10-15
sap Am. elm 10-15
Sweetgum 10-15
Honeylocust 30" dbh!
Ilex decidua
poison ivy
devil's walkingstick
greenbriar
white oak – mature 50 dbh near edge of patch

11F-2 GCKI (Kinglet)

Canopy 50%

Pignut hickory – 40 dbh
N. red oak – 35, 40
Sugar maple – 12 dbh

Midstory – 60%
Blackcherry – 10 dbh
Roughleaf dogwood – 6 dbh
* A. elm – 6-8
* S. red oak – 8 dbh – 12 dbh
E. redcedar – 11 dbh

10% – Herbaceous (5 ft)

Carex pennsylvanica 20%
~~[illegible]~~ j. honeysuckle 10%
V. creeper 2%
S. woodfern?
bedstraw 2%
Vitis riparia 10%

Understory - 40%

RTAA

* Am. elm
* Sweetgum
flowering dogwood
e. redcedar

woody vines
Vitis riparia
Berchemia scandens

Around pond - willow, river birch

S. red oak
Sweetgum
Am. elm
black cherry

11F-3

Canopy 60%

* Sweetgum - 20-25
* S. red oak - 18-20
Sycamore - 25-30
Sugar maple - 10

not in plot
*N. red oak 80+ dbh
(two)

Midstory - 30%

* Sweetgum - 15-18
Am. elm - 13-15

Understory
* Am. elm - 3-6 dbh
Sugar maple - 3-5
devil's walkingstick - <3
Vitis riparia -
V. creeper
ilex decidua

Herbaceous - 40%
wood violet
bedstraw
poison ivy
Carex sp
j. honeysuckle 2%
greenbriar

prothonotary warbler

narrow finger betw. field
* am. elm - shrubby w/ dense herbaceous
red buckeye

~~dea~~ Lamium spp.
V. creeper
Vicia
Oxalis
poison ivy
chickweed
May apple
fleabane
Carex sp.

---

east side of large patch
low spot sweet gum dom.
e. redcedar on ridge - w/ C. sessiliflorum underneath
sugarmaple understory

11F-4

Canopy - 50%
* White oak - 20 dbh
Shagbark hickory - 12 dbh
* N. red oak - 25 dbh, 30 dbh
black cherry - 12 dbh

Understory (sapling)
ligustrum 1%
w. oak
flowering dogwood
mockernut hickory

Mid story - 60
* Shagbark hickory 8-10
* Am. elm - 8-10
* w. oak - 8-10
blackgum ~~basswood~~ - 7-8
e. redcedar - 5-6
sycamore - 5-6
Mockernut hickory - 5-6

Herbaceous - 70%
* C. sessilflorum
mitchum carpet leaved
greenbriar
shield ferns
Myosotis (forget me not)
May apple

Woody vine - Vitis riparia
Berchimia scandens

huge 5-bole
black gum

N./S. red oak
e. redcedar
sugar maple

IIF-5

Canopy 50%

N. Red oak - 25-30
white oak - 25-30
e. redcedar - 15

Mid story - 60%

wh. oak - 10-12
am. elm - 7-9
black cherry - 5-6
mockern. hickory - 5-6

REV1

Understory (<1 dbh) - 60%
Ilex decidua
Mocker hickory
* Am. elm
* wh. oak

Herbaceous
greenbriar
Carex.
V. creeper
C. sessiliflorum
poison ivy

bump road field - drainage area

* Am. elm - dom.
large sycamore by creek
greenbriar

Denser herbaceous

IIF6

Canopy 40%
* Am. elm - 12-15"
willow oak - 17
Sycamore - 30"

Mid Story 60%
* N. red oak - 4
Mockernut hickory - 8
willow oak - 4
* am. elm - 4-6

Understory - 70%

* Red buckeye
  black gum
  mockernut hickory
* am. elm
  Lindera (spicebrush) <1%

Herbaceous
  chickweed
  bedstraw
  poison ivy
  may apple
  j. honeysuckle (*1%)
  deadnettle

last stop

honeysuckle + rubus on edge of narrow woodland dominated by elm + a few large sweetgum (25% canopy)

midstory/shrub layer = 80%

COPPERHEAD
ENVIRONMENTAL CONSULTING

Bat Habitat Assessment for the Proposed Yum Yum Solar Energy Center, Fayette County, Tennessee

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TABLE OF CONTENTS

DESCRIPTION OF PROPOSED PROJECT **1**

HABITAT ASSESSMENT **1**

Methods 1

RESULTS AND CONCLUSIONS **2**

LIST OF TABLES

Table 1: Potential Bat Habitat on the Proposed Yum Yum Solar Energy Center. 3

LIST OF FIGURES

Figure 1: Project Area and Bat Habitat Survey Boundary, Yum Yum Solar Energy Center, Fayette County, TN 8

Figure 2: Surveyed Woodlots and Potential Indiana and Northern Long-eared Bat Roosting Habitat, Yum Yum Solar Energy Center, Fayette County, TN 9

Figure 3: Potential Bat Roosting Habitat Within Project Footprint, Yum Yum Solar Energy Center, Fayette County, TN 10

Appendices

Appendix A: Photographic Record

Appendix B: USFWS Habitat Assessment Data Sheets

DESCRIPTION OF PROPOSED PROJECT

Yum Yum Solar LLC (Yum Yum Solar), a subsidiary of Invenergy Solar Project Development LLC (Invenergy), is proposing to develop the Yum Yum Solar Energy Center which would be constructed and operated by Yum Yum Solar and would have an alternating current (AC) generating capacity of 147 megawatts (MW). As part of a Power Purchase Agreement (PPA) between the Tennessee Valley Authority (TVA) and Yum Yum Solar, TVA would construct the proposed Yum Yum 161-kV Switching Station in association with the Yum Yum Solar Energy Center (collectively the "Project"). The proposed Project would occupy portions of 25 individual tracts, which in their entirety encompass nearly 4,000 contiguous acres in rural Fayette County, Tennessee, southwest of the unincorporated community of Yum Yum.

Copperhead Environmental Consulting, Inc. (Copperhead) was contracted by Yum Yum Solar to conduct a bat habitat suitability assessment of the proposed Project Area, which is an approximately 3,320-acre subset of the Project (Figure 1). Based on species distribution maps, target species for the habitat suitability assessment included the federally endangered Indiana bat (*Myotis sodalis; MYSO*) and the federally threatened northern long-eared bat (*Myotis septentrionalis; MYSE*). Copperhead biologists Steve Samoray and Shelby Patterson, who conducted the assessment, have a combined 25 years of experience conducting habitat assessments and tracking these bat species to roost trees.

HABITAT ASSESSMENT

The habitat assessment was conducted in accordance with guidelines outlined in the "2018 Range-wide Indiana Bat Survey Guidelines"[1] (USFWS 2018). In addition, TVA zoologist, Liz Hamrick, concurred with the methodology of the assessment during a conference call on 26 February 2019.

Methods

Prior to field work, a desktop review using Google Earth satellite imagery was performed to delineate and label all woodlots within the Project Area and to identify topography indictive of caves (e.g., sinkholes). On 27-29 March 2019, all forested areas within the Project area were traversed on foot to delineate and quantify potential Indiana and northern long-eared bat summer roosting habitat. In addition, the presence of foraging habitat, drinking habitat, and caves or underground mines that could provide potential winter habitat were recorded. USFWS defines suitable summer migratory tree-roosting bat habitat as forested/wooded habitats with suitable (i.e., open enough for bats to access) drinking and foraging areas, and Potential Roost Trees (PRT). A PRT has exfoliating bark, cracks, crevices or cavities that are >5" diameter at breast

[1] U.S. Fish and Wildlife Service. 2018. 2018 Range-Wide Indiana Bat Summer Survey Guidelines.

height (DBH) for Indiana bats and >3" DBH for northern long-eared bats. In addition, northern long-eared bats have been observed roosting in human-made structures such as buildings, bridges, and barns. Forested areas containing PRTs are hereafter referred to as "potential roosting habitat," or PRH. All human-made structures within northern long-eared bat PRH were considered possible roost structures. These resources were identified based on the characteristics described in the "2018 Range-wide Indiana Bat Summer Survey Guidelines" and the experience of the biologists (USFWS 2018). Representative photographs of PRTs were taken and any woodlot containing PRTs was designated as PRH for Indiana bats, northern long-eared bats, or both. Caves or underground mines (if present) were assessed for their ability to provide potential winter habitat based on size of opening, depth of passage, presence of airflow, and evidence of bat use.

RESULTS AND CONCLUSIONS

The entire Project Area (3,320 ac) was assessed during the desktop bat habitat assessment. Sixty-eight (68) woodlots covering 802 acres identified during the desktop review were examined during the field habitat assessment. Woodlots were generally fragmented hardwood stands separated by large agricultural fields. Additional descriptions of individual woodlots are in Appendix B.

Northern long-eared bat PRH was present in all 68 woodlots (832 ac) due to the smaller size requirements of their roost trees (3" DBH) and the species' solitary roosting habits (Figure 2). Human-made structures that could provide suitable roosting habitat for northern long-eared bats were found in woodlots 17, 26, 35, 42, and 66. Indiana bat PRH was identified in 15 woodlots, totaling 477 acres (Figure 2). Nine woodlots provide suitable drinking resources for both species due to the presence of water sources. Twenty-three woodlots provide suitable foraging habitat for both species (Table 1). No winter habitat in the form of caves or mines was found in the Project Area. Representative photographs of woodlots, PRTs, and human-made structures are in Appendix A and copies of USFWS Habitat Assessment Data Sheets are in Appendix B.

During preliminary design, efforts were undertaken to avoid or minimize impacts to potential bat habitat. As a result, the proposed Project Footprint in Figure 3 encompasses the area in which all infrastructure is sited (panels, collection line, laydown yards, substation, etc) and, as such, is a smaller area than the initial Project Area (see Figures 3A & 3B). The proposed project infrastructure has the potential to be sited on 67.39 of 832 total acres of northern long-eared bat PRH.

The Project Footprint was sited to avoid all 477 acres of Indiana bat PRH. All collection lines will be sited to avoid potential impacts to Indiana bat habitat as lines will be placed underground and constructed using boring equipment. Therefore, all Indiana bat PRH will be avoided (Figures 3A & 3B).

Table 1: Potential Bat Habitat on the Proposed Yum Yum Solar Energy Center. ***Note: all woodlots contained potential MYSE roosting habitat.***

Woodlot ID	Latitude/Longitude	Potential MYSO Roosting Habitat (Y/N)	Potential MYSO and MYSE Foraging Habitat (Y/N)	Presence of Potential Water Resource (Y/N)
3	35.345464, -89.377356	Y	Y	N
4	35.340739, -89.372680	Y	Y	Y
8	35.329545, -89.373520	Y	N	N
18	35.327370, -89.387080	Y	Y	N
19	35.338040, -89.393036	Y	Y	N
22	35.342015, -89.384266	Y	Y	N
23	35.341497, -89.393491	Y	Y	N
24	35.305925, -89.394495	Y	Y	N
36	35.323595, -89.411395	Y	Y	N
38	35.322911, -89.416809	Y	Y	N
41	35.326282, -89.426932	Y	Y	N
50	35.321661, -89.445027	Y	Y	N

Woodlot ID	Latitude/Longitude	Potential MYSO Roosting Habitat (Y/N)	Potential Bat Foraging Habitat (Y/N)	Presence of Potential Water Resource (Y/N)
58	35.325390, -89.449551	Y	Y	N
59	35.331092, -89.446387	Y	Y	N
67	35.330056, -89.434298	Y	Y	N
1	35.347913, -89.375691	N	N	N
2	35.348092, -89.373596	N	N	N
5	35.335614, -89.370789	N	Y	Y
6	35.336193, -89.364648	N	N	N
7	35.329627, -89.366166	N	Y	Y
9	35.327391, -89.378940	N	N	N
10	35.333515, -89.377391	N	Y	Y
11	35.331374, -89.380496	N	N	N
12	35.331553, -89.381842	N	N	N
13	35.333751, -89.380713	N	N	N
14	35.336889, -89.380594	N	N	N

Woodlot ID	Latitude/Longitude	Potential MYSO Roosting Habitat (Y/N)	Potential Bat Foraging Habitat (Y/N)	Presence of Potential Water Resource (Y/N)
15	35.337601, 35.337601	N	N	N
16	35.331927, -89.390186	N	N	Y
17	35.326620, -89.391482	N	N	N
20	35.338789, -89.381256	N	N	N
21	35.343698, -89.380770	N	N	N
25	35.308098, -89.391557	N	N	Y
26	35.314122, -89.391658	N	N	N
27	35.314767, -89.396349	N	N	N
29	35.322142, -89.396067	N	N	N
30	35.321546, -89.387065	N	N	N
31	35.320772, -89.383590	N	N	N
32	35.317285, -89.385966	N	N	N
33	35.321265, -89.378244	N	N	N
34	35.315428, -89.386457	N	N	N

Woodlot ID	Latitude/Longitude	Potential MYSO Roosting Habitat (Y/N)	Potential Bat Foraging Habitat (Y/N)	Presence of Potential Water Resource (Y/N)
35	35.315916, -89.388119	N	N	N
37	35.326874, -89.415481	N	N	N
39	35.325658, -89.421340	N	N	N
40	35.326513, -89.424577	N	N	N
42	35.325758, -89.433492	N	N	N
43	35.320489, -89.419901	N	N	N
44	35.331142, -89.449094	N	N	N
45	35.327163, -89.451456	N	N	N
46	35.320751, -89.439237	N	N	N
48	35.320875, -89.437424	N	N	N
49	35.318920, -89.440623	N	N	N
54	35.316350, -89.443845	N	Y	N
55	35.316606, -89.441132	N	N	N
56	35.316112, -89.437800	N	N	N

Woodlot ID	Latitude/Longitude	Potential MYSO Roosting Habitat (Y/N)	Potential Bat Foraging Habitat (Y/N)	Presence of Potential Water Resource (Y/N)
57	35.321638, -89.455697	N	Y	Y
60	35.330350, -89.450572	N	N	N
61	35.327768, -89.454496	N	N	N
62	35.329858, -89.454258	N	N	N
63	35.334238, -89.452509	N	N	N
64	35.332452, -89.453953	N	N	N
65	35.334337, -89.455816	N	N	N
66	35.341244, -89.387782	N	N	N
68	35.325824, -89.445609	N	Y	Y
69	35.317929, -89.425233	N	N	N
71	35.319864, -89.436225	N	Y	N
72	35.321398, -89.435925	N	Y	Y
73	35.323671, -89.440733	N	Y	Y
74	35.327782, -89.439068	N	N	N

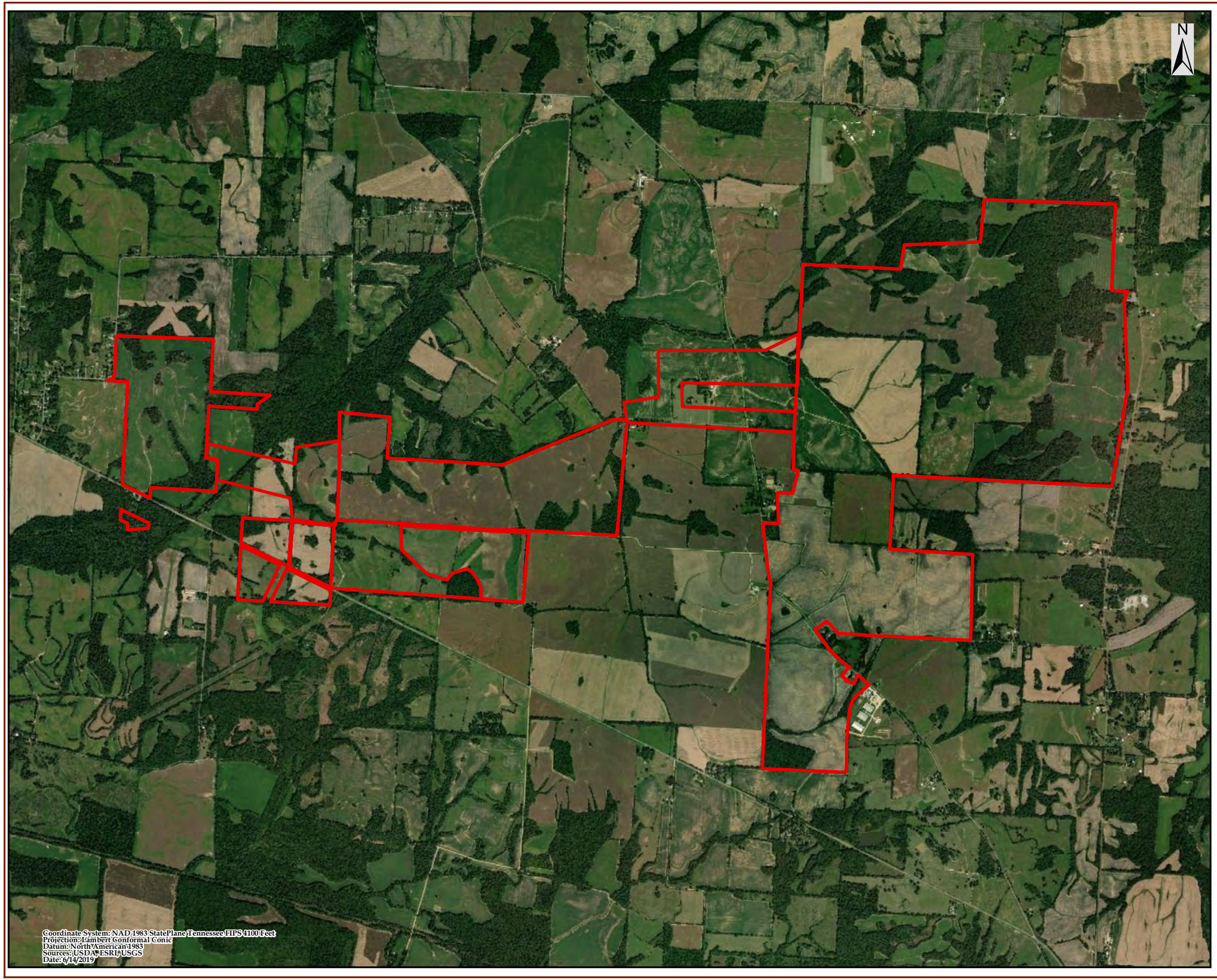

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FIGURE 1:
Project Area and Bat
Habitat Survey Boundary,
Yum Yum Solar Energy Center,
Fayette County, TN

Legend

Project Area Boundary

0 3,000 6,000
Feet

Scale: 1 in = 2,500 ft

Prepared by :

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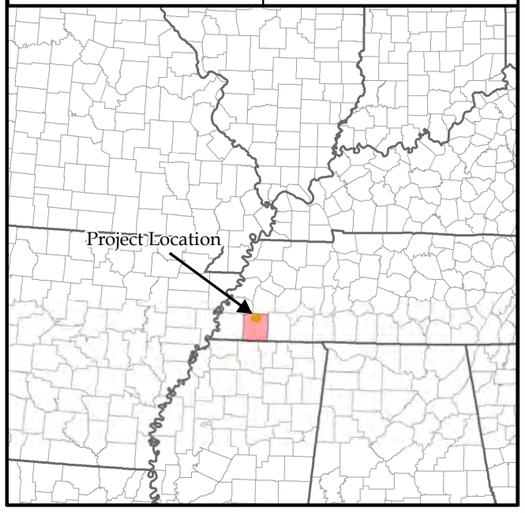
Drawn by:	CWM	Date:	6/14/2019
Checked by:	CAL	Revision:	



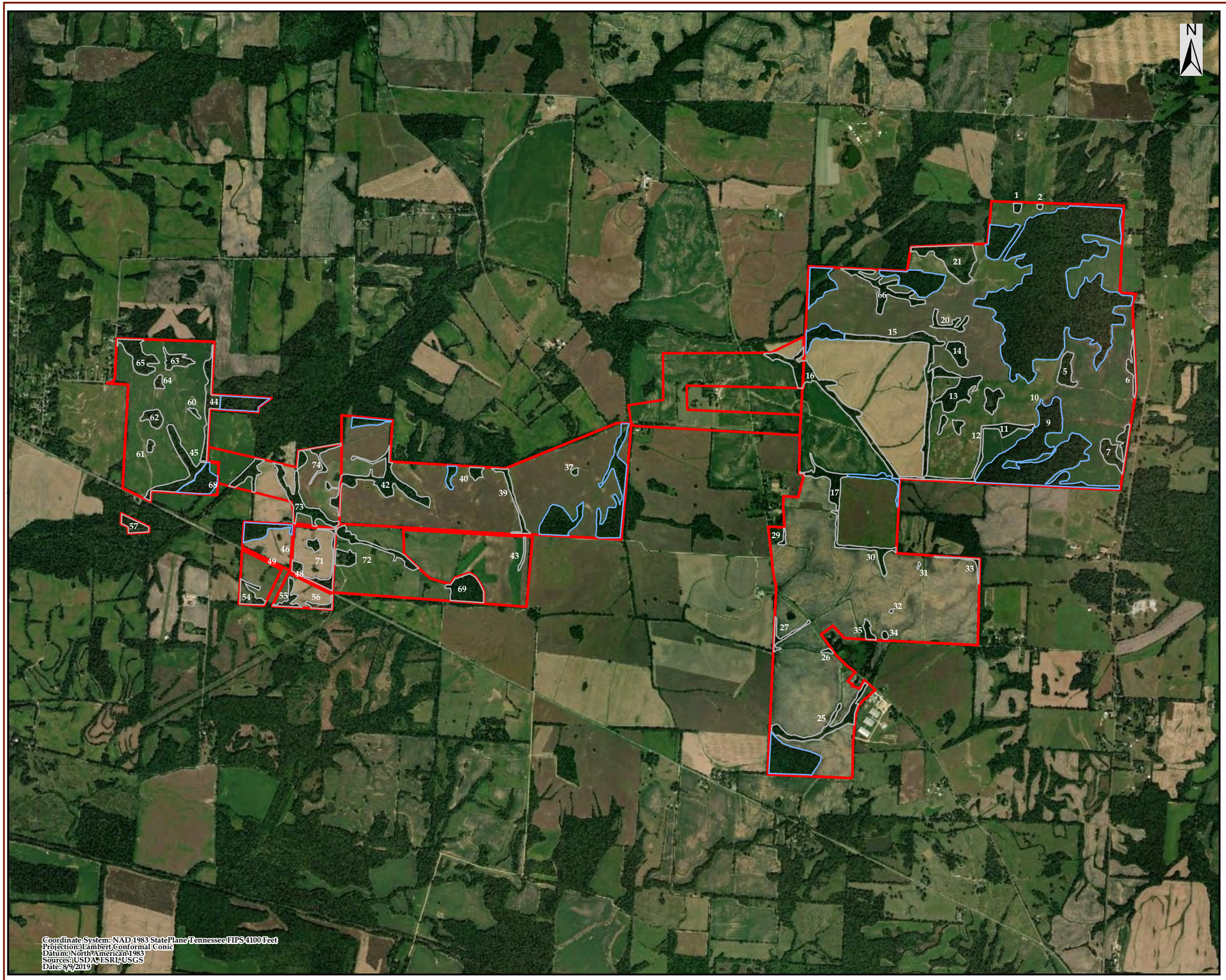


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FIGURE 2:
Surveyed Woodlots and Potential Indiana and Northern Long-eared Bat Roosting Habitat,
Yum Yum Solar Energy Center
Fayette County, TN

Legend

- Potential Indiana and Northern Long-eared Bat Roosting Habitat
- Potential Northern Long-eared Bat Roosting Habitat
- Project Area

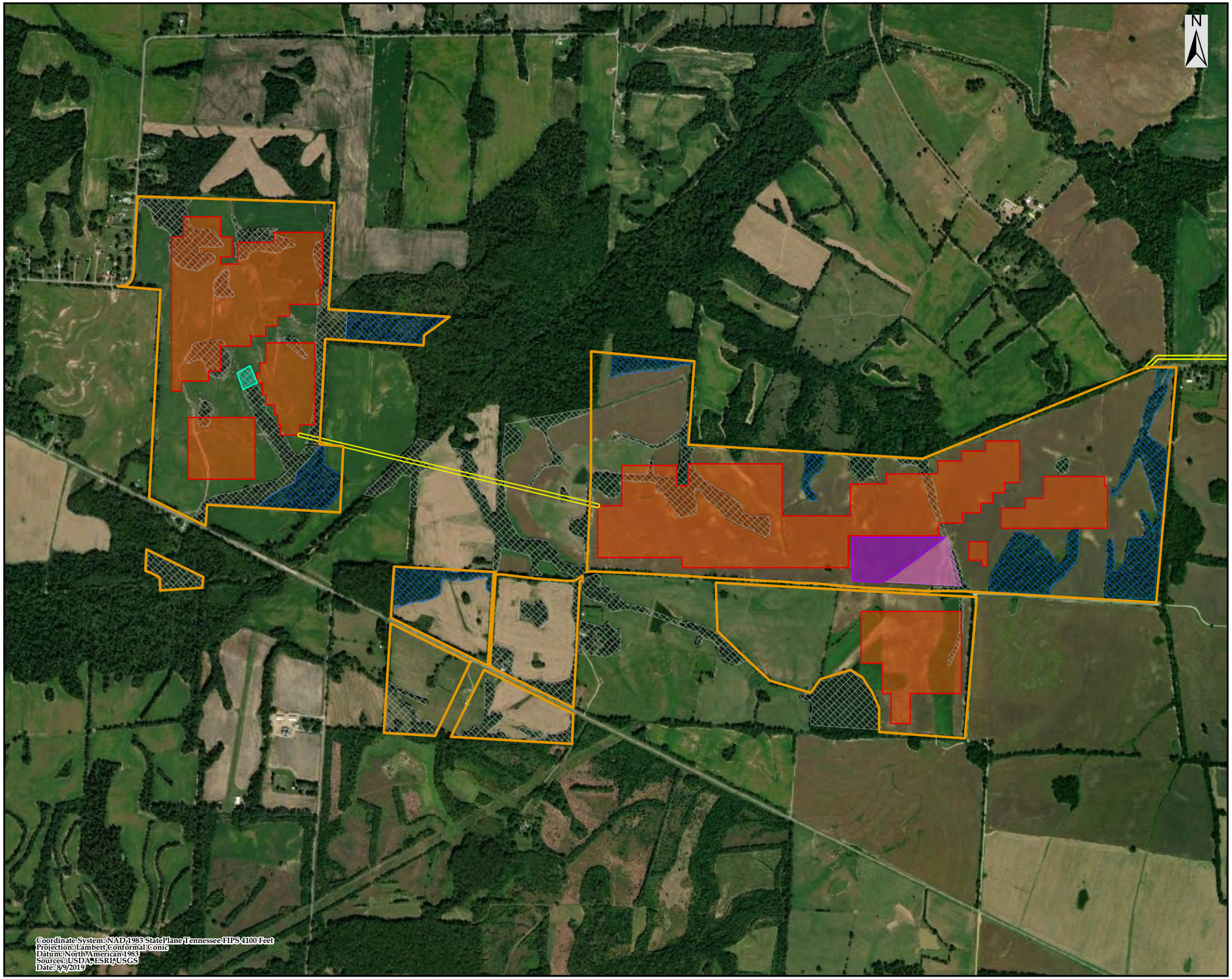
0 3,000 6,000
Feet

Scale: 1 in = 2,500 ft

Prepared by :

Copperhead Environmental Consulting, Inc.
3908 Gallatin Pike
Nashville, TN 37216

Drawn by:	CWM	Date:	8/9/2019
Checked by:	CAL	Revision:	



COPPERHEAD
ENVIRONMENTAL CONSULTING

FIGURE 3A:
Potential Bat Roosting Habitat
Within Project Footprint,
Yum Yum Solar Energy Center
Fayette County, TN

Legend

- Project Footprint
- UG Collection Line ROW
- Potential Indiana and Northern Long-eared Bat Roosting Habitat
- Potential Northern Long-eared Bat Roosting Habitat
- Laydown Yard
- Planned TVA Substation
- Road Corridor
- Racking

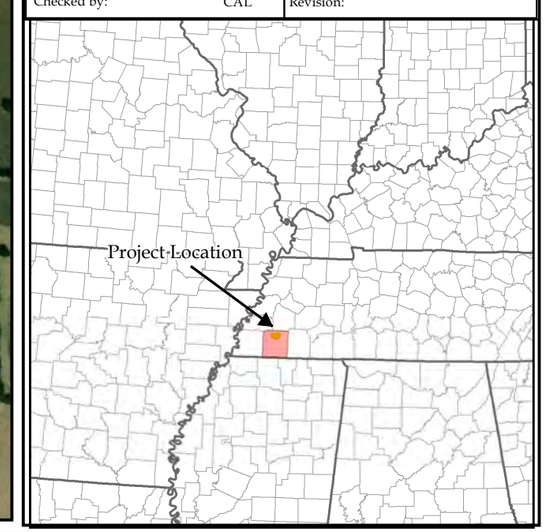
0 1,800 3,600
Feet

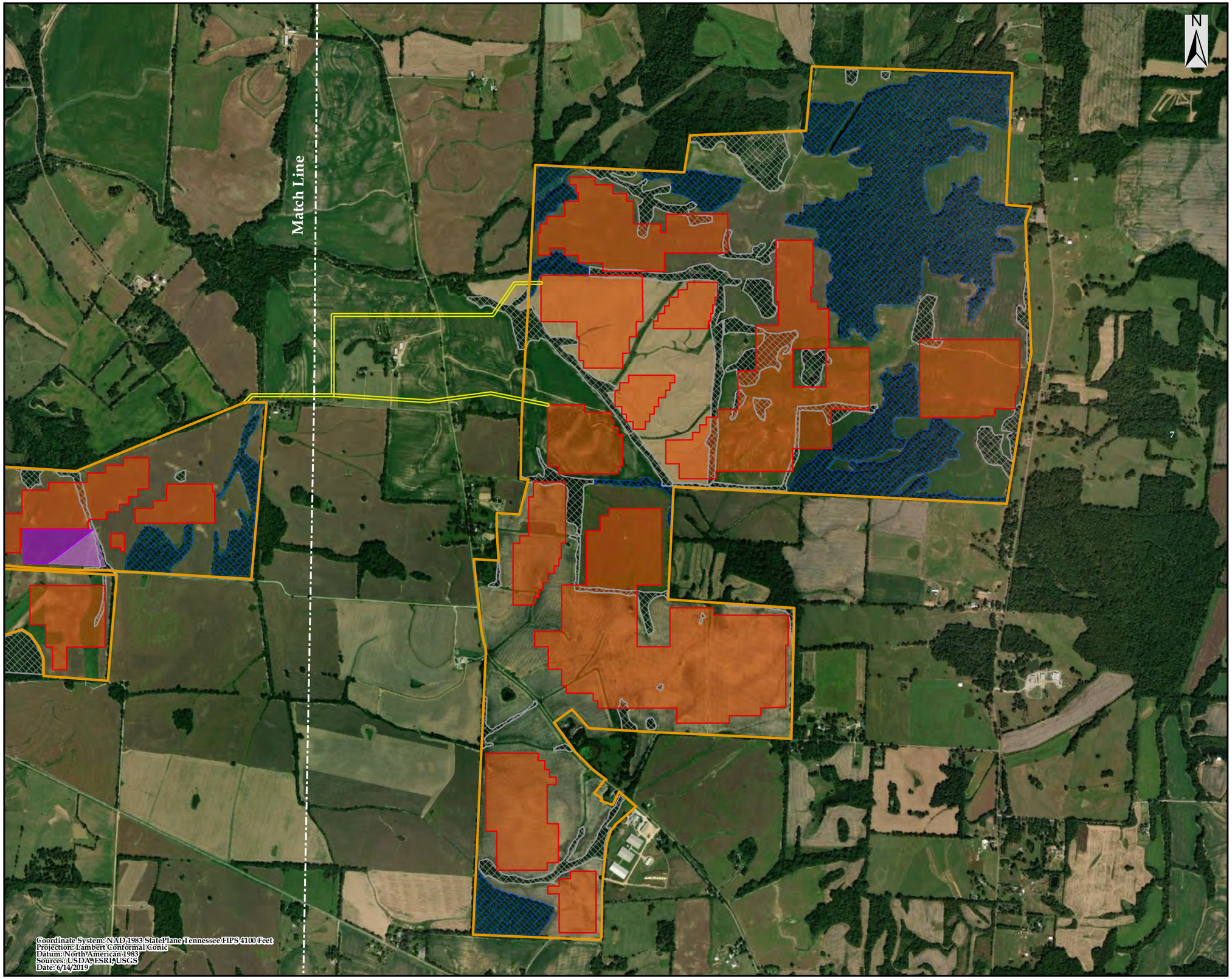
Scale: 1 in = 1,250 ft

Prepared by :

Copperhead Environmental Consulting, Inc.
3908 Gallatin Pike
Nashville, TN 37216

Drawn by:	CWM	Date:	8/9/2019
Checked by:	CAL	Revision:	





COPPERHEAD
ENVIRONMENTAL CONSULTING

FIGURE 3B:
Potential Bat Roosting Habitat
Within Project Footprint,
Yum Yum Solar Energy Center
Fayette County, TN

Legend

- Project Footprint
- UG Collection Line ROW
- Potential Indiana and Northern Long-eared Bat Roosting Habitat
- Potential Northern Long-eared Bat Roosting Habitat
- Laydown Yard
- Planned TVA Substation
- Racking

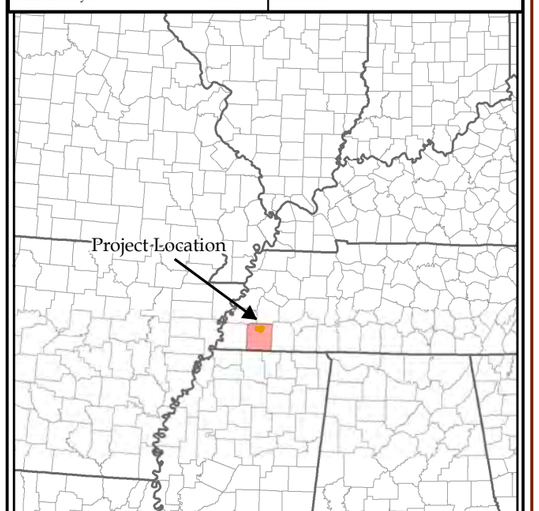
0 2,550 5,100
Feet

Scale: 1 in = 1,667 ft

Prepared by :

Copperhead Environmental Consulting, Inc.
3908 Gallatin Pike
Nashville, TN 37216

Drawn by:	CWM	Date:	6/14/2019
Checked by:	CAL	Revision:	



COPPERHEAD ENVIRONMENTAL CONSULTING	Appendix A: Bat Habitat Assessment for the Yum Yum Solar Energy Center, Photographic Record	
Project No.: 808	**County, State:** Fayette County, TN	**Client:** Yum Yum Solar LLC

Photo No.: 1	
Dates: 28 March 2019	
Location: Woodlot 24	
Description: Representative photo of a potential roost tree (PRT).	

Photo No.: 2	
Dates: 28 March 2019	
Location: Woodlot 19	
Description: Representative photo of a PRT.	

Photo No.: 3	
Dates: 28 March 2019	
Location: Woodlot 8	
Description: Representative photo of a PRT.	

Photo No.: 4	
Dates: 29 March 2019	
Location: Woodlot 38	
Description: Representative photo of a PRT.	

Photo No.: 5	
Dates: 28 March 2019	
Location: Woodlot 4	
Description: Representative photo of a PRT.	

Photo No.: 6	
Dates: 28 March 2019	
Location: Woodlot 67	
Description: Representative photo of a PRT.	

Photo No.: 7	
Dates: 28 March 2019	
Location: Woodlot 10	
Description: Pond in the middle of the woodlot that provides drinking and foraging habitat for bats.	

Photo No.: 8	
Dates: 29 March 2019	
Location: Woodlot 57	
Description: Laurel Creek provides drinking and foraging habitat.	

Photo No.: 9	
Dates: 29 March 2019	
Location: Woodlot 38	
Description: Ephemeral pool that is open enough for bats to access, but likely doesn't provide drinking habitat in summer.	

Photo No.: 10	
Dates: 27 March 2019	
Location: Woodlot 34	
Description: Stagnant, cluttered pond that likely doesn't provide drinking habitat.	

Photo No.: 11	
Dates: 28 March 2019	
Location: Woodlot 24	
Description: Potential bat habitat. The mid-story is open and several PRTs are present.	

Photo No.: 12	
Dates: 28 March 2019	
Location: Woodlot 4	
Description: Potential bat habitat. The mid-story is open and several PRTs are present.	

Photo No.: 13	
Dates: 28 March 2019	
Location: Woodlot 8	
Description: Potential bat habitat. The mid-story is open and several PRTs are present.	

Photo No.: 14	
Dates: 29 March 2019	
Location: Woodlot 41	
Description: Potential bat habitat. The mid-story is open and several PRTs are present.	

Photo No.: 15	
Dates: 29 March 2019	
Location: Woodlot 36	
Description: Potential bat habitat. The mid-story is open and several PRTs are present.	

Photo No.: 16	
Dates: 28 March 2019	
Location: Woodlot 30	
Description: Woodlot with cluttered mid-story consisting mostly of small, scrubby trees. It does not provide suitable roosting, foraging or drinking habitat. Old building could provide suitable northern long-eared bat roosting habitat	

Photo No.: 17	
Dates: 28 March 2019	
Location: Woodlot 14	
Description: Woodlot with cluttered mid-story consisting mostly of small, scrubby trees. It does not provide suitable roosting, foraging or drinking habitat.	

Photo No.: 18	
Dates: 28 March 2019	
Location: Woodlot 20	
Description: Woodlot with a cluttered mid-story. It does not provide suitable roosting, foraging or drinking habitat.	

Photo No.: 19	
Dates: 28 March 2019	
Location: Woodlot 7	
Description: Woodlot with cluttered mid-story consisting mostly of small, scrubby trees. It does not provide suitable roosting, foraging or drinking habitat.	

Photo No.: 20	
Dates: 29 March 2019	
Location: Woodlot 45	
Description: Woodlot with cluttered mid-story consisting mostly of small, scrubby trees. It does not provide suitable roosting, foraging or drinking habitat.	

Appendix B

USFWS Habitat Assessment Data Sheets

APPENDIX A: PHASE 1 HABITAT ASSESSMENTS

INDIANA BAT HABITAT ASSESSMENT DATASHEET

Project Name: 808 - Yum Yum Habitat Assessment Date: 4/1/19

Township/Range/Section:

Lat Long/UTM/ Zone: 35.327193, -89.392961 Surveyor: S Samoray, S. Patterson

Brief Project Description

New 3,150 acre solar farm in Yum Yum, TN

Project Area

	Total Acres	Forest Acres		Open Acres
Project	3,150.69	forested impacts - 102 3 ac		
Proposed Tree Removal (ac)	Completely cleared	Partially cleared (will leave trees)	Preserve acres- no clearing	
	unk	unk	unk	

Vegetation Cover Types

Pre-Project	Post-Project
190% of project area is AG fields with remaining areas consisting of deciduous woodlots	unknown

Landscape within 5 mile radius

Flight corridors to other forested areas?

N/A

Describe Adjacent Properties (e.g. forested, grassland, commercial or residencial development, water sources)

70% Ag field, 15% forested, 15% residential

Proximity to Public Land

What is the distance (mi.) from the project area to forested public lands (e.g., national or state forests, national or state parks, conservation areas, wildlife management areas)?

Hatchie National Wildlife Refuge is 22 KM to the Northeast of the project area.

APPENDIX A: PHASE 1 HABITAT ASSESSMENTS

Use additional sheets to assess discrete habitat types at multiple sites in a project area

Include a map depicting locations of sample sites if assessing discrete habitats at multiple sites in a project area

A single sheet can be used for multiple sample sites if habitat is the same

Sample Site Description
Sample Site No.(s): 1

Water Resources at Sample Site				
Stream Type (# and length)	Ephemeral	Intermittent	Perennial	Describe existing condition of water sources:
	—	—	—	
Pools/Ponds (# and size)	0	Open and accessible to bats?		NA
		NA		
Wetlands (approx. ac.)	Permanent	Seasonal		
	—	—		

Forest Resources at Sample Site				
Closure/Density	Canopy (> 50')	Midstory (20-50')	Understory (<20')	1=1-10%, 2=11-20%, 3=21-40%, 4=41-60%, 5=61-80%, 6=81=100%
	1	3	4	
Dominant Species of Mature Trees	Sweetgum Red Oak Elm			
% Trees w/ Exfoliating Bark	0	0	0	0
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)	
	55	25	15	
No. of Suitable Snags	0	0		

Standing dead trees with exfoliating bark, cracks, crevices, or hollows. Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BATS? No

Additional Comments:

Attach aerial photo of project site with all forested areas labeled and a general description of the habitat

Photographic Documentation: habitat shots at edge and interior from multiple locations; understory/midstory/canopy; examples of potential suitable snags and live trees; water sources

Use additional sheets to assess discrete habitat types at multiple sites in a project area

Include a map depicting locations of sample sites if assessing discrete habitats at multiple sites in a project area

A single sheet can be used for multiple sample sites if habitat is the same

Sample Site Description

Sample Site No.(s): 2

Water Resources at Sample Site

Stream Type (# and length)	Ephemeral	Intermittent	Perennial	Describe existing condition of water sources: NA
	—	—	—	
Pools/Ponds (# and size)	0	Open and accessible to bats? NA		
Wetlands (approx. ac.)	Permanent	Seasonal		
	—	—		

Forest Resources at Sample Site

Closure/Density	Canopy (> 50')	Midstory (20-50')	Understory (<20')	1=1-10%, 2=11-20%, 3=21-40%, 4=41-60%, 5=61-80%, 6=81=100%
	1	3	4	
Dominant Species of Mature Trees	Black Locust Am Elm Red Oak			
% Trees w/ Exfoliating Bark	0	0	0	0
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)	
	70	20	10	
No. of Suitable Snags	0	0		

Standing dead trees with exfoliating bark, cracks, crevices, or hollows. Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BATS? No

Additional Comments: Small woodlot along fence row. A lot of vines + clutter in midstory

Attach aerial photo of project site with all forested areas labeled and a general description of the habitat

Photographic Documentation: habitat shots at edge and interior from multiple locations; understory/midstory/canopy; examples of potential suitable snags and live trees; water sources

APPENDIX A: PHASE 1 HABITAT ASSESSMENTS

Use additional sheets to assess discrete habitat types at multiple sites in a project area

Include a map depicting locations of sample sites if assessing discrete habitats at multiple sites in a project area

A single sheet can be used for multiple sample sites if habitat is the same

Sample Site Description

Sample Site No.(s): 3 & 4

Water Resources at Sample Site

Stream Type (# and length)	Ephemeral	Intermittent	Perennial
	X	X	
Pools/Ponds (# and size)	—	Open and accessible to bats?	
		Yes *	
Wetlands (approx. ac.)	Permanent	Seasonal	

Describe existing condition of water sources: mostly dry channels w/ some pools. Averag 2-4' wide. Larger main channel has some pools but mostly dry

Forest Resources at Sample Site

Closure/Density	Canopy (> 50')	Midstory (20-50')	Understory (<20')
	2	2	2
Dominant Species of Mature Trees	Red oak White oak Shagbark Hickory Eastern Redcedar Shellbark Tulip Poplar		
% Trees w/ Exfoliating Bark	0	5%	10%
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)
	20	30	50
No. of Suitable Snags	0	0	

1=1-10%, 2=11-20%, 3=21-40%, 4=41-60%, 5=61-80%, 6=81=100%

Standing dead trees with exfoliating bark, cracks, crevices, or hollows. Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BATS? Yes

Additional Comments: Large woodlot w/ >100 shagbarks + white oaks w/ exfoliating bark. Streams are all branches flowing from field into large dry eroded channel in middle of woodlot
* still highly eroded, but use not likely

Attach aerial photo of project site with all forested areas labeled and a general description of the habitat

Photographic Documentation: habitat shots at edge and interior from multiple locations; understory/midstory/canopy; examples of potential suitable snags and live trees; water sources

APPENDIX A: PHASE 1 HABITAT ASSESSMENTS

Use additional sheets to assess discrete habitat types at multiple sites in a project area

Include a map depicting locations of sample sites if assessing discrete habitats at multiple sites in a project area

A single sheet can be used for multiple sample sites if habitat is the same

Sample Site Description

Sample Site No.(s): 5

Water Resources at Sample Site

Stream Type (# and length)	Ephemeral	Intermittent	Perennial	Describe existing condition of water sources: ~4' wide channel w/water bank to bank, no flow but opens up in middle of lot
	—	—	1	
Pools/Ponds (# and size)	—	Open and accessible to bats?		
		Yes		
Wetlands (approx. ac.)	Permanent	Seasonal		
	—	—		

Forest Resources at Sample Site

Closure/Density	Canopy (> 50')	Midstory (20-50')	Understory (<20')	1=1-10%, 2=11-20%, 3=21-40%, 4=41-60%, 5=61-80%, 6=81=100%
	2	3	3	
Dominant Species of Mature Trees	Red oak sweet gum willow oak winged elm sycamore			
% Trees w/ Exfoliating Bark	0	0	0	0
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)	
	50	40	10	
No. of Suitable Snags				

Standing dead trees with exfoliating bark, cracks, crevices, or hollows. Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BATS? No

Additional Comments: Stream could provide some drinking & foraging habitat but no PRT

Attach aerial photo of project site with all forested areas labeled and a general description of the habitat

Photographic Documentation: habitat shots at edge and interior from multiple locations; understory/midstory/canopy; examples of potential suitable snags and live trees; water sources

Use additional sheets to assess discrete habitat types at multiple sites in a project area

Include a map depicting locations of sample sites if assessing discrete habitats at multiple sites in a project area
A single sheet can be used for multiple sample sites if habitat is the same

Sample Site Description
Sample Site No.(s): 6

Water Resources at Sample Site				
Stream Type (# and length)	Ephemeral	Intermittent	Perennial	Describe existing condition of water sources:
	—	—	—	
Pools/Ponds (# and size)	—	Open and accessible to bats?		
		—		
Wetlands (approx. ac.)	Permanent	Seasonal		
	—	—		

Forest Resources at Sample Site				
Closure/Density	Canopy (> 50')	Midstory (20-50')	Understory (<20')	1=1-10%, 2=11-20%, 3=21-40%, 4=41-60%, 5=61-80%, 6=81=100%
	1	2	4	
Dominant Species of Mature Trees	red oak, American Elm			
% Trees w/ Exfoliating Bark	—	—	—	
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)	
	30	30	40	
No. of Suitable Snags		—		

Standing dead trees with exfoliating bark, cracks, crevices, or hollows. Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BATS? NO

Additional Comments:
wooded fence row with red oak, Am. Elm, and privet

Attach aerial photo of project site with all forested areas labeled and a general description of the habitat

Photographic Documentation: habitat shots at edge and interior from multiple locations; understory/midstory/canopy; examples of potential suitable snags and live trees; water sources

APPENDIX A: PHASE 1 HABITAT ASSESSMENTS

Use additional sheets to assess discrete habitat types at multiple sites in a project area

Include a map depicting locations of sample sites if assessing discrete habitats at multiple sites in a project area

A single sheet can be used for multiple sample sites if habitat is the same

Sample Site Description
Sample Site No.(s): 7

Water Resources at Sample Site				
Stream Type (# and length)	Ephemeral	Intermittent	Perennial	Describe existing condition of water sources: large pond in middle of site
Pools/Ponds (# and size)	1 (~ 60'x 80')	Open and accessible to bats? Yes		
Wetlands (approx. ac.)	Permanent	Seasonal		

Forest Resources at Sample Site				
Closure/Density	Canopy (> 50')	Midstory (20-50')	Understory (<20')	1=1-10%, 2=11-20%, 3=21-40%, 4=41-60%, 5=61-80%, 6=81=100%
	4	6	5	
Dominant Species of Mature Trees	red oak, white oak, cedar, poplar, red bud			
% Trees w/ Exfoliating Bark	0	0	0	
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)	
	30	45	25	
No. of Suitable Snags				

Standing dead trees with exfoliating bark, cracks, crevices, or hollows. Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BATS? NO

Additional Comments:

- pond provides good foraging area for bats but no roosting habitat present. Except for pond mid-story/understory is cluttered w/ vines & smaller trees pic of pond

Attach aerial photo of project site with all forested areas labeled and a general description of the habitat

Photographic Documentation: habitat shots at edge and interior from multiple locations; understory/midstory/canopy; examples of potential suitable snags and live trees; water sources

Use additional sheets to assess discrete habitat types at multiple sites in a project area

Include a map depicting locations of sample sites if assessing discrete habitats at multiple sites in a project area

A single sheet can be used for multiple sample sites if habitat is the same

Sample Site Description

Sample Site No.(s): 8

Water Resources at Sample Site

Stream Type (# and length)	Ephemeral	Intermittent	Perennial	Describe existing condition of water sources: small (1-3' wide) streams w/ no flow
	—	3	—	
Pools/Ponds (# and size)	—	Open and accessible to bats?		
		No		
Wetlands (approx. ac.)	Permanent	Seasonal		
	—	—		

Forest Resources at Sample Site

Closure/Density	Canopy (> 50')	Midstory (20-50')	Understory (<20')	1=1-10%, 2=11-20%, 3=21-40%, 4=41-60%, 5=61-80%, 6=81=100%
	3	2	2	
Dominant Species of Mature Trees	red oak white oak	tulip cedar sycamore	black locust	
% Trees w/ Exfoliating Bark	0	2	0	
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)	
	5	90	5	
No. of Suitable Snags		~10		

Standing dead trees with exfoliating bark, cracks, crevices, or hollows. Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BATS? Yes (roosting)

Additional Comments: - a lot of midstory vines, even age class but still open mid-canopy

snag w/ exfoliating bark pic

Attach aerial photo of project site with all forested areas labeled and a general description of the habitat

Photographic Documentation: habitat shots at edge and interior from multiple locations; understory/midstory/canopy; examples of potential suitable snags and live trees; water sources

Use additional sheets to assess discrete habitat types at multiple sites in a project area

Include a map depicting locations of sample sites if assessing discrete habitats at multiple sites in a project area

A single sheet can be used for multiple sample sites if habitat is the same

Sample Site Description

Sample Site No.(s): 9

Water Resources at Sample Site

	Ephemeral	Intermittent	Perennial
Stream Type (# and length)	—	1	—
Pools/Ponds (# and size)	—	Open and accessible to bats? NO	
Wetlands (approx. ac.)	Permanent —	Seasonal —	

Describe existing condition of water sources: 1' wide shallow stream w/ no flow

Forest Resources at Sample Site

	Canopy (> 50')	Midstory (20-50')	Understory (<20')
Closure/Density	3	4	4
Dominant Species of Mature Trees	red oak white oak cedar sycamore		
% Trees w/ Exfoliating Bark	0	0	0
Size Composition of Live Trees (%)	Small (3-8 in) 10	Med (9-15 in) 40	Large (>15 in) 60
No. of Suitable Snags	1		

1=1-10%, 2=11-20%, 3=21-40%, 4=41-60%, 5=61-80%, 6=81=100%

Standing dead trees with exfoliating bark, cracks, crevices, or hollows. Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BATS? NO

Additional Comments:

- Thin wooded fence row. A lot of mid-story vines

1 live damaged red oak (pic). Good roosting potential but not much solar exposure
↳ located midway along southern portion of 9

- Site 9 woodlot gets larger midway along the northern fence row + extends to the south but tree size + composition are the same. This is where the small stream is located

Attach aerial photo of project site with all forested areas labeled and a general description of the habitat

Photographic Documentation: habitat shots at edge and interior from multiple locations; understory/midstory/canopy; examples of potential suitable snags and live trees; water sources

Use additional sheets to assess discrete habitat types at multiple sites in a project area
Include a map depicting locations of sample sites if assessing discrete habitats at multiple sites in a project area
A single sheet can be used for multiple sample sites if habitat is the same

Sample Site Description
Sample Site No.(s): 10

Water Resources at Sample Site				
Stream Type (# and length)	Ephemeral	Intermittent	Perennial	Describe existing condition of water sources: large open pond, somewhat stagnant w/ half covered in aquatic vegetation
	—	—	—	
Pools/Ponds (# and size)	1 (200'x100')	Open and accessible to bats?		
		Yes		
Wetlands (approx. ac.)	Permanent	Seasonal		
	—	—		

Forest Resources at Sample Site				
Closure/Density	Canopy (> 50')	Midstory (20-50')	Understory (<20')	1=1-10%, 2=11-20%, 3=21-40%, 4=41-60%, 5=61-80%, 6=81=100%
	2	4	4	
Dominant Species of Mature Trees	White oak, river birch, red oak, tulip poplar			
% Trees w/ Exfoliating Bark	0	0	0	
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)	
	15	60	25	
No. of Suitable Snags				

Standing dead trees with exfoliating bark, cracks, crevices, or hollows. Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BATS? No

Additional Comments: Pond provides foraging & drinking habitat but no roosts present & forested area outside the pond is cluttered

Attach aerial photo of project site with all forested areas labeled and a general description of the habitat

Photographic Documentation: habitat shots at edge and interior from multiple locations; understory/midstory/canopy; examples of potential suitable snags and live trees; water sources

Use additional sheets to assess discrete habitat types at multiple sites in a project area

Include a map depicting locations of sample sites if assessing discrete habitats at multiple sites in a project area

A single sheet can be used for multiple sample sites if habitat is the same

Sample Site Description

Sample Site No.(s): 11

Water Resources at Sample Site

Stream Type (# and length)	Ephemeral	Intermittent	Perennial	Describe existing condition of water sources: shallow muddy stream 1-2' wide w/ pools + no flow
	—	1	—	
Pools/Ponds (# and size)	0	Open and accessible to bats?		
		NO		
Wetlands (approx. ac.)	Permanent	Seasonal		
	—	—		

Forest Resources at Sample Site

Closure/Density	Canopy (> 50')	Midstory (20-50')	Understory (<20')	1=1-10%, 2=11-20%, 3=21-40%, 4=41-60%, 5=61-80%, 6=81=100%
	1	4	5	
Dominant Species of Mature Trees	red oak osage honey locust	white elm black walnut	privet	
% Trees w/ Exfoliating Bark	0	0	0	0
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)	
	40	55	5	
No. of Suitable Snags	0	0		

Standing dead trees with exfoliating bark, cracks, crevices, or hollows. Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BATS? NO

Additional Comments:

—

Attach aerial photo of project site with all forested areas labeled and a general description of the habitat

Photographic Documentation: habitat shots at edge and interior from multiple locations; understory/midstory/canopy; examples of potential suitable snags and live trees; water sources

Use additional sheets to assess discrete habitat types at multiple sites in a project area

Include a map depicting locations of sample sites if assessing discrete habitats at multiple sites in a project area

A single sheet can be used for multiple sample sites if habitat is the same

Sample Site Description
Sample Site No.(s): 12

Water Resources at Sample Site				
Stream Type (# and length)	Ephemeral	Intermittent	Perennial	Describe existing condition of water sources: shallow 1-1' wide drainage stream
	1	—	—	
Pools/Ponds (# and size)	—	Open and accessible to bats?		
		No		
Wetlands (approx. ac.)	Permanent	Seasonal		
	—	—		

Forest Resources at Sample Site				
Closure/Density	Canopy (> 50')	Midstory (20-50')	Understory (<20')	1=1-10%, 2=11-20%, 3=21-40%, 4=41-60%, 5=61-80%, 6=81=100%
	NA	3	5	
Dominant Species of Mature Trees	Red oak black cherry white oak			
% Trees w/ Exfoliating Bark	0	0	0	0
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)	
	80	20	0	
No. of Suitable Snags				

Standing dead trees with exfoliating bark, cracks, crevices, or hollows. Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BATS? NO

Additional Comments: Small island of small trees in middle of ag field w/ a dry stream channel

Attach aerial photo of project site with all forested areas labeled and a general description of the habitat

Photographic Documentation: habitat shots at edge and interior from multiple locations; understory/midstory/canopy; examples of potential suitable snags and live trees; water sources

APPENDIX A: PHASE 1 HABITAT ASSESSMENTS

Use additional sheets to assess discrete habitat types at multiple sites in a project area

Include a map depicting locations of sample sites if assessing discrete habitats at multiple sites in a project area

A single sheet can be used for multiple sample sites if habitat is the same

Sample Site Description

Sample Site No.(s): 13

Water Resources at Sample Site

Stream Type (# and length)	Ephemeral	Intermittent	Perennial	Describe existing condition of water sources: dry ~2' wide shallow channel through most of wood lot w/ some standing water in western half
	+	1	—	
Pools/Ponds (# and size)	—	Open and accessible to bats?		
		NA		
Wetlands (approx. ac.)	Permanent	Seasonal		
	—	—		

Forest Resources at Sample Site

Closure/Density	Canopy (> 50')	Midstory (20-50')	Understory (<20')	1=1-10%, 2=11-20%, 3=21-40%, 4=41-60%, 5=61-80%, 6=81=100%
	3	6	4	
Dominant Species of Mature Trees	red oak white oak	river birch tulip	sycamore	
% Trees w/ Exfoliating Bark	0	0	0	—
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)	
	65	25	10	
No. of Suitable Snags	0	2		

Standing dead trees with exfoliating bark, cracks, crevices, or hollows. Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BATS? No

Additional Comments: good bit of smaller trees & a lot of grapevine & other vines make for a cluttered midstory/canopy. Two snags were vine covered w/ little solar exposure

Attach aerial photo of project site with all forested areas labeled and a general description of the habitat

Photographic Documentation: habitat shots at edge and interior from multiple locations; understory/midstory/canopy; examples of potential suitable snags and live trees; water sources

Use additional sheets to assess discrete habitat types at multiple sites in a project area

Include a map depicting locations of sample sites if assessing discrete habitats at multiple sites in a project area

A single sheet can be used for multiple sample sites if habitat is the same

Sample Site Description
Sample Site No.(s): 14

Water Resources at Sample Site				
Stream Type (# and length)	Ephemeral	Intermittent	Perennial	Describe existing condition of water sources: muddy no flow stream ~1-2' across
	—	1	—	
Pools/Ponds (# and size)	0	Open and accessible to bats?		
		No		
Wetlands (approx. ac.)	Permanent	Seasonal		
	—	—		

Forest Resources at Sample Site				
Closure/Density	Canopy (> 50')	Midstory (20-50')	Understory (<20')	1=1-10%, 2=11-20%, 3=21-40%, 4=41-60%, 5=61-80%, 6=81=100%
	3	5	6	
Dominant Species of Mature Trees	red oak, white oak, osage orange, tulip poplar, sweetgum, Am. Elm			
% Trees w/ Exfoliating Bark	0	0	0	
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)	
	40	45	15	
No. of Suitable Snags				

Standing dead trees with exfoliating bark, cracks, crevices, or hollows. Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BATS? No

Additional Comments: A lot vines in mid-story + canopy, very clutted mid-story

Attach aerial photo of project site with all forested areas labeled and a general description of the habitat

Photographic Documentation: habitat shots at edge and interior from multiple locations; understory/midstory/canopy; examples of potential suitable snags and live trees; water sources

Use additional sheets to assess discrete habitat types at multiple sites in a project area

Include a map depicting locations of sample sites if assessing discrete habitats at multiple sites in a project area
A single sheet can be used for multiple sample sites if habitat is the same

Sample Site Description
Sample Site No.(s): 15

Water Resources at Sample Site				
Stream Type (# and length)	Ephemeral	Intermittent	Perennial	Describe existing condition of water sources: small dry (~1' wide) channel w/ a lot of clutter
	—	1	—	
Pools/Ponds (# and size)	0	Open and accessible to bats?		
		NO		
Wetlands (approx. ac.)	Permanent	Seasonal		
	—	—		

Forest Resources at Sample Site				
Closure/Density	Canopy (> 50')	Midstory (20-50')	Understory (<20')	1=1-10%, 2=11-20%, 3=21-40%, 4=41-60%, 5=61-80%, 6=81=100%
	1	3	5	
Dominant Species of Mature Trees	sweetgum honey locust	white oak, red oak		
% Trees w/ Exfoliating Bark	0	0	0	0
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)	
	10	40	50	
No. of Suitable Snags	0	0		

Standing dead trees with exfoliating bark, cracks, crevices, or hollows. Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BATS? NO

Additional Comments: a lot of vines + clutter in mid story. Primarily a forested fence row w/ a bit more width on the western portion

Attach aerial photo of project site with all forested areas labeled and a general description of the habitat

Photographic Documentation: habitat shots at edge and interior from multiple locations; understory/midstory/canopy; examples of potential suitable snags and live trees; water sources

Use additional sheets to assess discrete habitat types at multiple sites in a project area

Include a map depicting locations of sample sites if assessing discrete habitats at multiple sites in a project area

A single sheet can be used for multiple sample sites if habitat is the same

Sample Site Description

Sample Site No.(s): 16

Water Resources at Sample Site				
Stream Type (# and length)	Ephemeral	Intermittent	Perennial	Describe existing condition of water sources: clay-bottom channels ~1-6' wide w/ slow flowing water + some pools. Intermittent channels to main stream dry w/ some pools
	—	3	1	
Pools/Ponds (# and size)	0	Open and accessible to bats?		
		Yes		
Wetlands (approx. ac.)	Permanent	Seasonal		
	—	—		

Forest Resources at Sample Site				
Closure/Density	Canopy (> 50')	Midstory (20-50')	Understory (<20')	1=1-10%, 2=11-20%, 3=21-40%, 4=41-60%, 5=61-80%, 6=81=100%
	1	3	4	
Dominant Species of Mature Trees	Sycamore, red oak, Black walnut			
% Trees w/ Exfoliating Bark	0	0	0	
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)	
	40	25	35	
No. of Suitable Snags	0	0		

Standing dead trees with exfoliating bark, cracks, crevices, or hollows. Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BATS? No

Additional Comments: a lot of mid + under story vines make access to water hard @ ~ 75% of the site

Attach aerial photo of project site with all forested areas labeled and a general description of the habitat

Photographic Documentation: habitat shots at edge and interior from multiple locations; understory/midstory/canopy; examples of potential suitable snags and live trees; water sources

Use additional sheets to assess discrete habitat types at multiple sites in a project area

Include a map depicting locations of sample sites if assessing discrete habitats at multiple sites in a project area

A single sheet can be used for multiple sample sites if habitat is the same

Sample Site Description
Sample Site No.(s): 17

Water Resources at Sample Site				
Stream Type (# and length)	Ephemeral	Intermittent	Perennial	Describe existing condition of water sources: stagnant cluttered clay bottom stream
	–	1	–	
Pools/Ponds (# and size)	–	Open and accessible to bats?		
		NO		
Wetlands (approx. ac.)	Permanent	Seasonal		
	–	–		

Forest Resources at Sample Site				
Closure/Density	Canopy (> 50')	Midstory (20-50')	Understory (<20')	1=1-10%, 2=11-20%, 3=21-40%, 4=41-60%, 5=61-80%, 6=81=100%
	3	5	6	
Dominant Species of Mature Trees	Black locust, white oak, sycamore, red oak, privet, sweetgum			
% Trees w/ Exfoliating Bark	0	0	0	
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)	
	20	30	50	
No. of Suitable Snags	1			

Standing dead trees with exfoliating bark, cracks, crevices, or hollows. Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BATS? NO

Additional Comments: Even w/ some larger trees the site is very cluttered w/ vines and invasives

Attach aerial photo of project site with all forested areas labeled and a general description of the habitat

Photographic Documentation: habitat shots at edge and interior from multiple locations; understory/midstory/canopy; examples of potential suitable snags and live trees; water sources

Use additional sheets to assess discrete habitat types at multiple sites in a project area
Include a map depicting locations of sample sites if assessing discrete habitats at multiple sites in a project area
A single sheet can be used for multiple sample sites if habitat is the same

Sample Site Description
Sample Site No.(s): 18

Water Resources at Sample Site

Stream Type (# and length)	Ephemeral	Intermittent	Perennial	Describe existing condition of water sources:
	—	—	—	
Pools/Ponds (# and size)	0	Open and accessible to bats?		NA
		NA		
Wetlands (approx. ac.)	Permanent	Seasonal		
	—	—		

Forest Resources at Sample Site

Closure/Density	Canopy (> 50')	Midstory (20-50')	Understory (<20')	1=1-10%, 2=11-20%, 3=21-40%, 4=41-60%, 5=61-80%, 6=81=100%
	1	3	4	
Dominant Species of Mature Trees	red oak			
% Trees w/ Exfoliating Bark	0	0	4	
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)	
	20	5	75	
No. of Suitable Snags			3	

Standing dead trees with exfoliating bark, cracks, crevices, or hollows. Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BATS? Yes

Additional Comments: Fence row w/ larger trees. Habitat present based on 3 large snags w/ exfoliating bark + cavities & 1 large (1½' DBH) live-dangerd red oak

Pics of snags

Attach aerial photo of project site with all forested areas labeled and a general description of the habitat

Photographic Documentation: habitat shots at edge and interior from multiple locations; understory/midstory/canopy; examples of potential suitable snags and live trees; water sources

Use additional sheets to assess discrete habitat types at multiple sites in a project area

Include a map depicting locations of sample sites if assessing discrete habitats at multiple sites in a project area

A single sheet can be used for multiple sample sites if habitat is the same

Sample Site Description
Sample Site No.(s): 19

Water Resources at Sample Site				
Stream Type (# and length)	Ephemeral	Intermittent	Perennial	Describe existing condition of water sources: small intermittent stream w/ no flow + clutter on SW spur
	—	—	—	
Pools/Ponds (# and size)	0	Open and accessible to bats?		
		No		
Wetlands (approx. ac.)	Permanent	Seasonal		
	—	—		

cross + road part of IG

Forest Resources at Sample Site				
Closure/Density	Canopy (> 50')	Midstory (20-50')	Understory (<20')	1=1-10%, 2=11-20%, 3=21-40%, 4=41-60%, 5=61-80%, 6=81=100%
Dominant Species of Mature Trees	red oak, white oak, black locust, sycamore, Am Elm, shellbark			
% Trees w/ Exfoliating Bark	0	5%	3%	
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)	
	30	10	60	
No. of Suitable Snags	0	0		

Standing dead trees with exfoliating bark, cracks, crevices, or hollows. Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BATS? Yes (roosts)

Additional Comments: lots of vines through out the mid story but larger trees + several large shagbarks + shellbarks

Pics of shagbarks

Attach aerial photo of project site with all forested areas labeled and a general description of the habitat

Photographic Documentation: habitat shots at edge and interior from multiple locations; understory/midstory/canopy; examples of potential suitable snags and live trees; water sources

Use additional sheets to assess discrete habitat types at multiple sites in a project area

Include a map depicting locations of sample sites if assessing discrete habitats at multiple sites in a project area

A single sheet can be used for multiple sample sites if habitat is the same

Sample Site Description

Sample Site No.(s): 20

Water Resources at Sample Site

Stream Type (# and length)	Ephemeral	Intermittent	Perennial	Describe existing condition of water sources:
	—	—	—	
Pools/Ponds (# and size)	0	Open and accessible to bats?		NA
		—		
Wetlands (approx. ac.)	Permanent	Seasonal		
	—	—		

Forest Resources at Sample Site

Closure/Density	Canopy (> 50')	Midstory (20-50')	Understory (<20')	1=1-10%, 2=11-20%, 3=21-40%, 4=41-60%, 5=61-80%, 6=81=100%
	2	4	6	
Dominant Species of Mature Trees	osage orange elm river birch			
% Trees w/ Exfoliating Bark	0	0	0	0
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)	
	20	75	5	
No. of Suitable Snags	0	0		

Standing dead trees with exfoliating bark, cracks, crevices, or hollows. Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BATS? No

Additional Comments: Two clutterd lots bisected by a gas line ROW. A lot of vines in midstory + canopy

Attach aerial photo of project site with all forested areas labeled and a general description of the habitat

Photographic Documentation: habitat shots at edge and interior from multiple locations; understory/midstory/canopy; examples of potential suitable snags and live trees; water sources

Use additional sheets to assess discrete habitat types at multiple sites in a project area

Include a map depicting locations of sample sites if assessing discrete habitats at multiple sites in a project area

A single sheet can be used for multiple sample sites if habitat is the same

Sample Site Description
Sample Site No.(s): 21

Water Resources at Sample Site				
Stream Type (# and length)	Ephemeral	Intermittent	Perennial	Describe existing condition of water sources:
	—	—	—	
Pools/Ponds (# and size)	—	Open and accessible to bats?		
		—		
Wetlands (approx. ac.)	Permanent	Seasonal		
	—	—		

Forest Resources at Sample Site				
Closure/Density	Canopy (> 50')	Midstory (20-50')	Understory (<20')	1=1-10%, 2=11-20%, 3=21-40%, 4=41-60%, 5=61-80%, 6=81=100%
	N/A	4	6	
Dominant Species of Mature Trees	Hackberry, E. Red cedar			
% Trees w/ Exfoliating Bark	—	—	—	—
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)	
	90	10	0	
No. of Suitable Snags		—		

Standing dead trees with exfoliating bark, cracks, crevices, or hollows. Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BATS? NO

Additional Comments:
young Hackberry stands w/ E Red cedar

Attach aerial photo of project site with all forested areas labeled and a general description of the habitat

Photographic Documentation: habitat shots at edge and interior from multiple locations; understory/midstory/canopy; examples of potential suitable snags and live trees; water sources

Use additional sheets to assess discrete habitat types at multiple sites in a project area

Include a map depicting locations of sample sites if assessing discrete habitats at multiple sites in a project area

A single sheet can be used for multiple sample sites if habitat is the same

Sample Site Description

Sample Site No.(s): 22

Water Resources at Sample Site				
Stream Type (# and length)	Ephemeral	Intermittent	Perennial	Describe existing condition of water sources: eroded clay bottom channels w/ several pools
	—	2	—	
Pools/Ponds (# and size)	0	Open and accessible to bats?		
		No		
Wetlands (approx. ac.)	Permanent	Seasonal		
	—	—		

Forest Resources at Sample Site				
Closure/Density	Canopy (> 50')	Midstory (20-50')	Understory (<20')	1=1-10%, 2=11-20%, 3=21-40%, 4=41-60%, 5=61-80%, 6=81=100%
	3	3	5	
Dominant Species of Mature Trees	white oak, red oak, shellbark hickory, sycamore, sweetgum, river birch			
% Trees w/ Exfoliating Bark	0	0	10%	
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)	
	40	30	30	
No. of Suitable Snags	0	2		

Standing dead trees with exfoliating bark, cracks, crevices, or hollows. Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BATS? Yes

Additional Comments: mid-story/canopy w/ a lot of vines + clutter on western end but opens up as you move east into larger block. >30 shagbarks + shall barks + some large white oaks w/ exfoliating bark

Attach aerial photo of project site with all forested areas labeled and a general description of the habitat

Photographic Documentation: habitat shots at edge and interior from multiple locations; understory/midstory/canopy; examples of potential suitable snags and live trees; water sources

Use additional sheets to assess discrete habitat types at multiple sites in a project area

Include a map depicting locations of sample sites if assessing discrete habitats at multiple sites in a project area

A single sheet can be used for multiple sample sites if habitat is the same

Sample Site Description

Sample Site No.(s): 23

Water Resources at Sample Site

Stream Type (# and length)	Ephemeral	Intermittent	Perennial	Describe existing condition of water sources: deeply eroded w/ some pools
	—	1		
Pools/Ponds (# and size)	0	Open and accessible to bats?		
		NO		
Wetlands (approx. ac.)	Permanent	Seasonal		
	—	—		

Forest Resources at Sample Site

Closure/Density	Canopy (> 50')	Midstory (20-50')	Understory (<20')	1=1-10%, 2=11-20%, 3=21-40%, 4=41-60%, 5=61-80%, 6=81-100%
	3	3	3	
Dominant Species of Mature Trees	white oak, shellbark hickory, shagbark, red oak, black locust			
% Trees w/ Exfoliating Bark	0	0	10%	—
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)	
	15	50	35	
No. of Suitable Snags			~25	

Standing dead trees with exfoliating bark, cracks, crevices, or hollows. Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BATS? Yes

Additional Comments: Open wood lot w/ several shag & shell bark hickories. Becomes a little more cluttered to the east but PRT still present there.

Attach aerial photo of project site with all forested areas labeled and a general description of the habitat

Photographic Documentation: habitat shots at edge and interior from multiple locations; understory/midstory/canopy; examples of potential suitable snags and live trees; water sources

Use additional sheets to assess discrete habitat types at multiple sites in a project area

Include a map depicting locations of sample sites if assessing discrete habitats at multiple sites in a project area

A single sheet can be used for multiple sample sites if habitat is the same

Sample Site Description

Sample Site No.(s): 24

Water Resources at Sample Site				
Stream Type (# and length)	Ephemeral	Intermittent	Perennial	Describe existing condition of water sources: wetland area near center of woodlot, no open water
	—	—	—	
Pools/Ponds (# and size)	0	Open and accessible to bats?		
		NO		
Wetlands (approx. ac.)	Permanent	Seasonal		
	—	1		

Forest Resources at Sample Site				
Closure/Density	Canopy (> 50')	Midstory (20-50')	Understory (<20')	1=1-10%, 2=11-20%, 3=21-40%, 4=41-60%, 5=61-80%, 6=81=100%
Dominant Species of Mature Trees	white oak, red oak, shellbark Hickory, Am. Hornbeam			
% Trees w/ Exfoliating Bark				
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)	
	10	30	60	
No. of Suitable Snags		~30		

Standing dead trees with exfoliating bark, cracks, crevices, or hollows. Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BATS? Yes

Additional Comments: ~30 PRT all over 5" DBH - exfoliating bark + crevices, fairly open stand w/ mature trees of various species

Pics - photo of shellbark hickory + cavity tree taken

Attach aerial photo of project site with all forested areas labeled and a general description of the habitat

Photographic Documentation: habitat shots at edge and interior from multiple locations; understory/midstory/canopy; examples of potential suitable snags and live trees; water sources

Use additional sheets to assess discrete habitat types at multiple sites in a project area

Include a map depicting locations of sample sites if assessing discrete habitats at multiple sites in a project area

A single sheet can be used for multiple sample sites if habitat is the same

Sample Site Description

Sample Site No.(s): 25

Water Resources at Sample Site

Stream Type (# and length)	Ephemeral	Intermittent	Perennial	Describe existing condition of water sources: eroded stream w/ some pools open enough for bats
			1	
Pools/Ponds (# and size)		Open and accessible to bats?		
		Yes		
Wetlands (approx. ac.)	Permanent	Seasonal		
	—	—		

Forest Resources at Sample Site

Closure/Density	Canopy (> 50')	Midstory (20-50')	Understory (<20')	1=1-10%, 2=11-20%, 3=21-40%, 4=41-60%, 5=61-80%, 6=81=100%
	2	4	4	
Dominant Species of Mature Trees	red oak, sycamore, black locust, sweetgum			
% Trees w/ Exfoliating Bark	0	0	0	
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)	
	20	60	20	
No. of Suitable Snags	0	0		

Standing dead trees with exfoliating bark, cracks, crevices, or hollows. Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BATS? NO

Additional Comments: Stream gets much smaller + cluttered w/ fewer large trees as it you go west through the field

Pics 26-30

Attach aerial photo of project site with all forested areas labeled and a general description of the habitat

Photographic Documentation: habitat shots at edge and interior from multiple locations; understory/midstory/canopy; examples of potential suitable snags and live trees; water sources

Use additional sheets to assess discrete habitat types at multiple sites in a project area

Include a map depicting locations of sample sites if assessing discrete habitats at multiple sites in a project area

A single sheet can be used for multiple sample sites if habitat is the same

Sample Site Description
Sample Site No.(s): 26

Water Resources at Sample Site				
Stream Type (# and length)	Ephemeral	Intermittent	Perennial	Describe existing condition of water sources:
	—	—	—	—
Pools/Ponds (# and size)	0	Open and accessible to bats?		
		— NA		
Wetlands (approx. ac.)	Permanent	Seasonal		
	—	—		

Forest Resources at Sample Site				
Closure/Density	Canopy (> 50')	Midstory (20-50')	Understory (<20')	1=1-10%, 2=11-20%, 3=21-40%, 4=41-60%, 5=61-80%, 6=81=100%
	1	5	6	
Dominant Species of Mature Trees	mockernut Hickory. red oak			
% Trees w/ Exfoliating Bark	0	0	0	
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)	
	39	60	1	
No. of Suitable Snags	0	0		

Standing dead trees with exfoliating bark, cracks, crevices, or hollows. Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BATS? NO

Additional Comments:
Old building w/ small woodlot around it

Attach aerial photo of project site with all forested areas labeled and a general description of the habitat

Photographic Documentation: habitat shots at edge and interior from multiple locations; understory/midstory/canopy; examples of potential suitable snags and live trees; water sources

Use additional sheets to assess discrete habitat types at multiple sites in a project area

Include a map depicting locations of sample sites if assessing discrete habitats at multiple sites in a project area
A single sheet can be used for multiple sample sites if habitat is the same

Sample Site Description

Sample Site No.(s): 27

Water Resources at Sample Site

Stream Type (# and length)	Ephemeral	Intermittent	Perennial	Describe existing condition of water sources: small ditch ~ 2' wide w/ some small pools not accessible to bats
	—	1	—	
Pools/Ponds (# and size)	0	Open and accessible to bats?		
		NO		
Wetlands (approx. ac.)	Permanent	Seasonal		
	0	0		

Forest Resources at Sample Site

Closure/Density	Canopy (> 50')	Midstory (20-50')	Understory (<20')	1=1-10%, 2=11-20%, 3=21-40%, 4=41-60%, 5=61-80%, 6=81=100%
	NA	1	2	
Dominant Species of Mature Trees	E. red cedar, mockernut hickory, osage orange			
% Trees w/ Exfoliating Bark	0	0	0	
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)	
	80	20	0	
No. of Suitable Snags	0	0		

Standing dead trees with exfoliating bark, cracks, crevices, or hollows. Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BATS? No

Additional Comments:

Pics 39-41

Attach aerial photo of project site with all forested areas labeled and a general description of the habitat

Photographic Documentation: habitat shots at edge and interior from multiple locations; understory/midstory/canopy; examples of potential suitable snags and live trees; water sources

Use additional sheets to assess discrete habitat types at multiple sites in a project area

Include a map depicting locations of sample sites if assessing discrete habitats at multiple sites in a project area

A single sheet can be used for multiple sample sites if habitat is the same

Sample Site Description
Sample Site No.(s): 29

Water Resources at Sample Site				
Stream Type (# and length)	Ephemeral	Intermittent	Perennial	Describe existing condition of water sources: NA
	—	—	—	
Pools/Ponds (# and size)	0	Open and accessible to bats?		
		—		
Wetlands (approx. ac.)	Permanent	Seasonal		
	—	—		

Forest Resources at Sample Site				
Closure/Density	Canopy (> 50')	Midstory (20-50')	Understory (<20')	1=1-10%, 2=11-20%, 3=21-40%, 4=41-60%, 5=61-80%, 6=81=100%
	1	6	6	
Dominant Species of Mature Trees	Black locust, red oak, osage orange			
% Trees w/ Exfoliating Bark	0	0	0	0
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)	
	38	60	2	
No. of Suitable Snags	0	0		

Standing dead trees with exfoliating bark, cracks, crevices, or hollows. Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BATS? NO

Additional Comments:
small tree line along residential property

Attach aerial photo of project site with all forested areas labeled and a general description of the habitat

Photographic Documentation: habitat shots at edge and interior from multiple locations; understory/midstory/canopy; examples of potential suitable snags and live trees; water sources

Use additional sheets to assess discrete habitat types at multiple sites in a project area
Include a map depicting locations of sample sites if assessing discrete habitats at multiple sites in a project area
A single sheet can be used for multiple sample sites if habitat is the same

Sample Site Description

Sample Site No.(s): 30

Water Resources at Sample Site

Stream Type (# and length)	Ephemeral	Intermittent	Perennial
	–	1	–
Pools/Ponds (# and size)	0	Open and accessible to bats?	
		NO	
Wetlands (approx. ac.)	Permanent	Seasonal	
	–	–	

Describe existing condition of water sources: ~2' wide ditch w/ a lot of clutter.

Forest Resources at Sample Site

Closure/Density	Canopy (> 50')	Midstory (20-50')	Understory (<20')	1=1-10%, 2=11-20%, 3=21-40%, 4=41-60%, 5=61-80%, 6=81=100%
	1	2	5	
Dominant Species of Mature Trees	osage orange, red oak, sycamore			
% Trees w/ Exfoliating Bark	0	0	0	0
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)	
	28	70	2	
No. of Suitable Snags	0	0		

Standing dead trees with exfoliating bark, cracks, crevices, or hollows. Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BATS? NO

Additional Comments:

wooded fence row w/ small stream through the eastern portion. Mostly small scrubby trees w/ 5-8 large DBH (") red oaks

Pics 21-23

Attach aerial photo of project site with all forested areas labeled and a general description of the habitat

Photographic Documentation: habitat shots at edge and interior from multiple locations; understory/midstory/canopy; examples of potential suitable snags and live trees; water sources

Use additional sheets to assess discrete habitat types at multiple sites in a project area

Include a map depicting locations of sample sites if assessing discrete habitats at multiple sites in a project area

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Sample Site Description

Sample Site No.(s): 31, 33

Water Resources at Sample Site				
Stream Type (# and length)	Ephemeral	Intermittent	Perennial	Describe existing condition of water sources:
	—	—	—	
Pools/Ponds (# and size)	0	Open and accessible to bats?		—
		NA		
Wetlands (approx. ac.)	Permanent	Seasonal		
	—	—		

Forest Resources at Sample Site				
Closure/Density	Canopy (> 50')	Midstory (20-50')	Understory (<20')	1=1-10%, 2=11-20%, 3=21-40%, 4=41-60%, 5=61-80%, 6=81-100%
	1	3	3	
Dominant Species of Mature Trees	red oak, E. red cedar, osage orange			
% Trees w/ Exfoliating Bark	0	0	0	
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)	
	50	0	50	
No. of Suitable Snags				

Standing dead trees with exfoliating bark, cracks, crevices, or hollows. Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BATS? NO

Additional Comments:

1 large red oak @ southern end of site 31 is a 38" DBH live damaged tree w/ some potential roosting habitat

Site 33 is just a small corner of a wood lot on the NE corner of a cattle field w/ only 10-15 small trees

Pics 18-20

Attach aerial photo of project site with all forested areas labeled and a general description of the habitat

Photographic Documentation: habitat shots at edge and interior from multiple locations; understory/midstory/canopy; examples of potential suitable snags and live trees; water sources

Use additional sheets to assess discrete habitat types at multiple sites in a project area

Include a map depicting locations of sample sites if assessing discrete habitats at multiple sites in a project area

A single sheet can be used for multiple sample sites if habitat is the same

Sample Site Description
Sample Site No.(s): 34, 32

Water Resources at Sample Site				
Stream Type (# and length)	Ephemeral	Intermittent	Perennial	Describe existing condition of water sources: cluttered stagnant pond
	—	—	—	
Pools/Ponds (# and size)	1 pond	Open and accessible to bats?		
		No		
Wetlands (approx. ac.)	Permanent	Seasonal		
	—	—		

Forest Resources at Sample Site				
Closure/Density	Canopy (> 50')	Midstory (20-50')	Understory (<20')	1=1-10%, 2=11-20%, 3=21-40%, 4=41-60%, 5=61-80%, 6=81=100%
	5	5	5	
Dominant Species of Mature Trees	Black willow red oak sweetgum			
% Trees w/ Exfoliating Bark	0	0	0	
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)	
	15	80	5	
No. of Suitable Snags				

Standing dead trees with exfoliating bark, cracks, crevices, or hollows. Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BATS? No

Additional Comments: Both sites are cluttered tree islands in a cotton field. Site 32 is an old cemetery.

~~Average~~

Pics 1-9

Attach aerial photo of project site with all forested areas labeled and a general description of the habitat

Photographic Documentation: habitat shots at edge and interior from multiple locations; understory/midstory/canopy; examples of potential suitable snags and live trees; water sources

Use additional sheets to assess discrete habitat types at multiple sites in a project area

Include a map depicting locations of sample sites if assessing discrete habitats at multiple sites in a project area

A single sheet can be used for multiple sample sites if habitat is the same

Sample Site Description
Sample Site No.(s): 35

Water Resources at Sample Site				
Stream Type (# and length)	Ephemeral	Intermittent	Perennial	Describe existing condition of water sources: dry channel
	1			
Pools/Ponds (# and size)	—	Open and accessible to bats?		
		No		
Wetlands (approx. ac.)	Permanent	Seasonal		
	—	—		

Forest Resources at Sample Site				
Closure/Density	Canopy (> 50')	Midstory (20-50')	Understory (<20')	1=1-10%, 2=11-20%, 3=21-40%, 4=41-60%, 5=61-80%, 6=81=100%
	NA	6	6	
Dominant Species of Mature Trees	red oak, osage orange, E red cedar, mockernut Hickory			
% Trees w/ Exfoliating Bark	0	0	0	—
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)	
	80	15	5	
No. of Suitable Snags				

Standing dead trees with exfoliating bark, cracks, crevices, or hollows. Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BATS? No

Additional Comments:
Pics 10-15

Attach aerial photo of project site with all forested areas labeled and a general description of the habitat

Photographic Documentation: habitat shots at edge and interior from multiple locations; understory/midstory/canopy; examples of potential suitable snags and live trees; water sources

APPENDIX A: PHASE 1 HABITAT ASSESSMENTS

Use additional sheets to assess discrete habitat types at multiple sites in a project area

Include a map depicting locations of sample sites if assessing discrete habitats at multiple sites in a project area

A single sheet can be used for multiple sample sites if habitat is the same

Sample Site Description
Sample Site No.(s): 36

Water Resources at Sample Site				
Stream Type (# and length)	Ephemeral	Intermittent	Perennial	Describe existing condition of water sources: NA
	—	—	—	
Pools/Ponds (# and size)	—	Open and accessible to bats? NA		
Wetlands (approx. ac.)	Permanent	Seasonal		
	—	—		

Forest Resources at Sample Site				
Closure/Density	Canopy (> 50')	Midstory (20-50')	Understory (<20')	1=1-10%, 2=11-20%, 3=21-40%, 4=41-60%, 5=61-80%, 6=81=100%
	1	2	3	
Dominant Species of Mature Trees	white oak, shagbark Hickory, Red cedar, red oak, Am. Hornbeam, shellbark			
% Trees w/ Exfoliating Bark	0	0	1%	~~6~~
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)	
	15	35	50	
No. of Suitable Snags	0	0		

Standing dead trees with exfoliating bark, cracks, crevices, or hollows. Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BATS? Yes

Additional Comments: Mixed aged stand w/ ATV trails through out. Greater than 50 suitable shagbark, shell bark + white oaks

Attach aerial photo of project site with all forested areas labeled and a general description of the habitat

Photographic Documentation: habitat shots at edge and interior from multiple locations; understory/midstory/canopy; examples of potential suitable snags and live trees; water sources

APPENDIX A: PHASE 1 HABITAT ASSESSMENTS

Use additional sheets to assess discrete habitat types at multiple sites in a project area

Include a map depicting locations of sample sites if assessing discrete habitats at multiple sites in a project area
A single sheet can be used for multiple sample sites if habitat is the same

Sample Site Description
Sample Site No.(s): 37

Water Resources at Sample Site				
Stream Type (# and length)	Ephemeral	Intermittent	Perennial	Describe existing condition of water sources: Old pond ~ 30'x15' over grown
	—	—	—	
Pools/Ponds (# and size)	—	Open and accessible to bats?		
		NO		
Wetlands (approx. ac.)	Permanent	Seasonal		
	1	—		

Forest Resources at Sample Site				
Closure/Density	Canopy (> 50 ')	Midstory (20-50')	Understory (<20')	1=1-10%, 2=11-20%, 3=21-40%, 4=41-60%, 5=61-80%, 6=81=100%
	1	3	5	
Dominant Species of Mature Trees	black locust, red oak			
% Trees w/ Exfoliating Bark	0	0	0	0
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)	
	30	60	10	
No. of Suitable Snags	0	0		

Standing dead trees with exfoliating bark, cracks, crevices, or hollows. Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BATS? No

Additional Comments:
Old pond + a few trees in middle of ag field

Attach aerial photo of project site with all forested areas labeled and a general description of the habitat

Photographic Documentation: habitat shots at edge and interior from multiple locations; understory/midstory/canopy; examples of potential suitable snags and live trees; water sources

APPENDIX A: PHASE 1 HABITAT ASSESSMENTS

Use additional sheets to assess discrete habitat types at multiple sites in a project area

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A single sheet can be used for multiple sample sites if habitat is the same

Sample Site Description
Sample Site No.(s): 38

Water Resources at Sample Site				
Stream Type (# and length)	Ephemeral	Intermittent	Perennial	Describe existing condition of water sources: shallow muddy channel, looks to be part of the wetland in the NE portion. Open enough for bats to get to but very dry in summer
	—	1	—	
Pools/Ponds (# and size)	—	Open and accessible to bats?		
		NO		
Wetlands (approx. ac.)	Permanent	Seasonal		
	1	—		

Forest Resources at Sample Site				
Closure/Density	Canopy (> 50')	Midstory (20-50')	Understory (<20')	1=1-10%, 2=11-20%, 3=21-40%, 4=41-60%, 5=61-80%, 6=81=100%
	2	3	3	
Dominant Species of Mature Trees	Am Elm, red oak, Hackberry, Shellbark, white oak, sycamore			
% Trees w/ Exfoliating Bark	0	0	1	—
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)	
	10	50	40	
No. of Suitable Snags	0	1		

Standing dead trees with exfoliating bark, cracks, crevices, or hollows. Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BATS? Yes

Additional Comments: The NE extention of this site is where the wetland area is. It is clutered w/ vines but the remaining portion of the site is more open w/ large trees + > 30 shagbarks/shellbarks. One large white oak snag on southern portion along road is a good PRT

Attach aerial photo of project site with all forested areas labeled and a general description of the habitat

Photographic Documentation: habitat shots at edge and interior from multiple locations; understory/midstory/canopy; examples of potential suitable snags and live trees; water sources

Use additional sheets to assess discrete habitat types at multiple sites in a project area

Include a map depicting locations of sample sites if assessing discrete habitats at multiple sites in a project area
A single sheet can be used for multiple sample sites if habitat is the same

Sample Site Description

Sample Site No.(s): 39

Water Resources at Sample Site				
Stream Type (# and length)	Ephemeral	Intermittent	Perennial	Describe existing condition of water sources: cluttered sand bottom stream bed
	1	—	—	
Pools/Ponds (# and size)	0	Open and accessible to bats? NO		
Wetlands (approx. ac.)	Permanent	Seasonal		
	—	—		

Forest Resources at Sample Site				
Closure/Density	Canopy (> 50')	Midstory (20-50')	Understory (<20')	1=1-10%, 2=11-20%, 3=21-40%, 4=41-60%, 5=61-80%, 6=81=100%
	1	3	5	
Dominant Species of Mature Trees	Am Elm, Osage orange, sweet gum, pine			
% Trees w/ Exfoliating Bark	0	0	0	
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)	
	55	30	15	
No. of Suitable Snags	0	0		

Standing dead trees with exfoliating bark, cracks, crevices, or hollows. Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BATS? NO

Additional Comments: Thin woodlot along dry, cluttered stream bed

Attach aerial photo of project site with all forested areas labeled and a general description of the habitat

Photographic Documentation: habitat shots at edge and interior from multiple locations; understory/midstory/canopy; examples of potential suitable snags and live trees; water sources

Use additional sheets to assess discrete habitat types at multiple sites in a project area

Include a map depicting locations of sample sites if assessing discrete habitats at multiple sites in a project area
A single sheet can be used for multiple sample sites if habitat is the same

Sample Site Description
Sample Site No.(s): 40

Water Resources at Sample Site				
Stream Type (# and length)	Ephemeral	Intermittent	Perennial	Describe existing condition of water sources: dry channel - eroded, ~3-4' wide
	1	-		
Pools/Ponds (# and size)	0	Open and accessible to bats? NA		
Wetlands (approx. ac.)	Permanent	Seasonal		
	—	—		

Forest Resources at Sample Site				
Closure/Density	Canopy (> 50')	Midstory (20-50')	Understory (<20')	1=1-10%, 2=11-20%, 3=21-40%, 4=41-60%, 5=61-80%, 6=81=100%
	2	3	4	
Dominant Species of Mature Trees	red oak, Am Elm, Sourwood, river birch			
% Trees w/ Exfoliating Bark	0	0	0	0
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)	
	60	20	20	
No. of Suitable Snags	0	0		

Standing dead trees with exfoliating bark, cracks, crevices, or hollows. Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BATS? NO

Additional Comments: Cluttered w/ vines w/ a small clearer area in middle near deer stand.

Attach aerial photo of project site with all forested areas labeled and a general description of the habitat

Photographic Documentation: habitat shots at edge and interior from multiple locations; understory/midstory/canopy; examples of potential suitable snags and live trees; water sources

Use additional sheets to assess discrete habitat types at multiple sites in a project area

Include a map depicting locations of sample sites if assessing discrete habitats at multiple sites in a project area
A single sheet can be used for multiple sample sites if habitat is the same

Sample Site Description
Sample Site No.(s): 41

Water Resources at Sample Site				
Stream Type (# and length)	Ephemeral	Intermittent	Perennial	Describe existing condition of water sources:
	—	—	—	
Pools/Ponds (# and size)	0	Open and accessible to bats? NA		
Wetlands (approx. ac.)	Permanent	Seasonal		
	—	—		

Forest Resources at Sample Site				
Closure/Density	Canopy (> 50')	Midstory (20-50')	Understory (<20')	1=1-10%, 2=11-20%, 3=21-40%, 4=41-60%, 5=61-80%, 6=81=100%
	1	2	4	
Dominant Species of Mature Trees	white oak, shellbark, Tulip poplar, sycamore			
% Trees w/ Exfoliating Bark	0	0	1%	
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)	
	40	30	30	
No. of Suitable Snags	0	0		

Standing dead trees with exfoliating bark, cracks, crevices, or hollows. Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BATS? Yes

Additional Comments: Southern tip of wood lot is just a single row of trees but as you move north it widens and is fairly open w/ 5 large shellbarks w/ exfoliating bark

Attach aerial photo of project site with all forested areas labeled and a general description of the habitat

Photographic Documentation: habitat shots at edge and interior from multiple locations; understory/midstory/canopy; examples of potential suitable snags and live trees; water sources

APPENDIX A: PHASE 1 HABITAT ASSESSMENTS

Use additional sheets to assess discrete habitat types at multiple sites in a project area

Include a map depicting locations of sample sites if assessing discrete habitats at multiple sites in a project area
A single sheet can be used for multiple sample sites if habitat is the same

Sample Site Description

Sample Site No.(s): 42

Water Resources at Sample Site				
Stream Type (# and length)	Ephemeral	Intermittent	Perennial	Describe existing condition of water sources:
	—	—	—	
Pools/Ponds (# and size)	0	Open and accessible to bats?		NA
		NA		
Wetlands (approx. ac.)	Permanent	Seasonal		
	—	—		

Forest Resources at Sample Site				
Closure/Density	Canopy (> 50')	Midstory (20-50')	Understory (<20')	1=1-10%, 2=11-20%, 3=21-40%, 4=41-60%, 5=61-80%, 6=81=100%
	3	5	3	
Dominant Species of Mature Trees	red oak, sweetgum, sycamore, tulip poplar, & red cedar			
% Trees w/ Exfoliating Bark	0	0	0	0
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)	
	40	40	20	
No. of Suitable Snags	0	0		

Standing dead trees with exfoliating bark, cracks, crevices, or hollows. Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BATS? NO

Additional Comments: Series of similar tree lines w/ larger forested area to the SE. Tree line are only 2-3 trees wide, the SE extension has a cluttered midstory/canopy w/ a lot of vines & young sweetgums

Attach aerial photo of project site with all forested areas labeled and a general description of the habitat

Photographic Documentation: habitat shots at edge and interior from multiple locations; understory/midstory/canopy; examples of potential suitable snags and live trees; water sources

APPENDIX A: PHASE 1 HABITAT ASSESSMENTS

Use additional sheets to assess discrete habitat types at multiple sites in a project area

Include a map depicting locations of sample sites if assessing discrete habitats at multiple sites in a project area
A single sheet can be used for multiple sample sites if habitat is the same

Sample Site Description
Sample Site No.(s): 43

Water Resources at Sample Site				
Stream Type (# and length)	Ephemeral	Intermittent	Perennial	Describe existing condition of water sources:
	—	—	—	
Pools/Ponds (# and size)	Ø	Open and accessible to bats? NO		NA
Wetlands (approx. ac.)	Permanent	Seasonal		
	—	—		

Forest Resources at Sample Site				
Closure/Density	Canopy (> 50')	Midstory (20-50')	Understory (<20')	1=1-10%, 2=11-20%, 3=21-40%, 4=41-60%, 5=61-80%, 6=81=100%
	1	2	2	
Dominant Species of Mature Trees	sweet gum, tulippoplar, red cedar			
% Trees w/ Exfoliating Bark	0	0	0	
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)	
	10	30	60	
No. of Suitable Snags	0	0		

Standing dead trees with exfoliating bark, cracks, crevices, or hollows. Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BATS? No

Additional Comments: Two thin force rows

Attach aerial photo of project site with all forested areas labeled and a general description of the habitat

Photographic Documentation: habitat shots at edge and interior from multiple locations; understory/midstory/canopy; examples of potential suitable snags and live trees; water sources

APPENDIX A: PHASE 1 HABITAT ASSESSMENTS

Use additional sheets to assess discrete habitat types at multiple sites in a project area

Include a map depicting locations of sample sites if assessing discrete habitats at multiple sites in a project area
A single sheet can be used for multiple sample sites if habitat is the same

Sample Site Description
Sample Site No.(s): _____ 44

Water Resources at Sample Site				
Stream Type (# and length)	Ephemeral	Intermittent	Perennial	Describe existing condition of water sources:
	—	—	—	
Pools/Ponds (# and size)	0	Open and accessible to bats?		NA
		NA		
Wetlands (approx. ac.)	Permanent	Seasonal		
	—	—		

Forest Resources at Sample Site				
Closure/Density	Canopy (> 50')	Midstory (20-50')	Understory (<20')	1=1-10%, 2=11-20%, 3=21-40%, 4=41-60%, 5=61-80%, 6=81=100%
	1	5	6	
Dominant Species of Mature Trees	Pin oak, E. red cedar, red oak			
% Trees w/ Exfoliating Bark	0	0	0	
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)	
	75	20	5	
No. of Suitable Snags	0	0		

Standing dead trees with exfoliating bark, cracks, crevices, or hollows. Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BATS? _____ No _____

Additional Comments:

Attach aerial photo of project site with all forested areas labeled and a general description of the habitat

Photographic Documentation: habitat shots at edge and interior from multiple locations; understory/midstory/canopy; examples of potential suitable snags and live trees; water sources

APPENDIX A: PHASE 1 HABITAT ASSESSMENTS

Use additional sheets to assess discrete habitat types at multiple sites in a project area

Include a map depicting locations of sample sites if assessing discrete habitats at multiple sites in a project area

A single sheet can be used for multiple sample sites if habitat is the same

Sample Site Description
Sample Site No.(s): 45

Water Resources at Sample Site				
Stream Type (# and length)	Ephemeral	Intermittent	Perennial	Describe existing condition of water sources: NA
	—	—	—	
Pools/Ponds (# and size)	—	Open and accessible to bats? NA		
Wetlands (approx. ac.)	Permanent	Seasonal		
	—	—		

Forest Resources at Sample Site				
Closure/Density	Canopy (> 50')	Midstory (20-50')	Understory (<20')	1=1-10%, 2=11-20%, 3=21-40%, 4=41-60%, 5=61-80%, 6=81=100%
	NA	6	6	
Dominant Species of Mature Trees	sycamore boxelder red oak sweetgum			
% Trees w/ Exfoliating Bark	0	0	0	0
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)	
	90	5	5	
No. of Suitable Snags	0	0		

Standing dead trees with exfoliating bark, cracks, crevices, or hollows. Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BATS? NO

Additional Comments: Tree line and edge of floodplain. Thick lot of even-aged boxelder + sweetgum throughout w/ some large red oaks mixed NW extension

Attach aerial photo of project site with all forested areas labeled and a general description of the habitat

Photographic Documentation: habitat shots at edge and interior from multiple locations; understory/midstory/canopy; examples of potential suitable snags and live trees; water sources

APPENDIX A: PHASE 1 HABITAT ASSESSMENTS

Use additional sheets to assess discrete habitat types at multiple sites in a project area

Include a map depicting locations of sample sites if assessing discrete habitats at multiple sites in a project area
A single sheet can be used for multiple sample sites if habitat is the same

Sample Site Description
Sample Site No.(s): 46

Water Resources at Sample Site				
Stream Type (# and length)	Ephemeral	Intermittent	Perennial	Describe existing condition of water sources: 70' x 20' pond w/ saplings throughout
	—	—	—	
Pools/Ponds (# and size)	1	Open and accessible to bats? NO		
Wetlands (approx. ac.)	Permanent	Seasonal		
	—	—		

Forest Resources at Sample Site				
Closure/Density	Canopy (> 50')	Midstory (20-50')	Understory (<20')	1=1-10%, 2=11-20%, 3=21-40%, 4=41-60%, 5=61-80%, 6=81=100%
	1	2	3	
Dominant Species of Mature Trees	red oak hackberry pine			
% Trees w/ Exfoliating Bark	0	0	0	
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)	
	40	40	20	
No. of Suitable Snags				

Standing dead trees with exfoliating bark, cracks, crevices, or hollows. Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BATS? NO

Additional Comments: Wood island in middle of cottonfield

Attach aerial photo of project site with all forested areas labeled and a general description of the habitat

Photographic Documentation: habitat shots at edge and interior from multiple locations; understory/midstory/canopy; examples of potential suitable snags and live trees; water sources

APPENDIX A: PHASE 1 HABITAT ASSESSMENTS

Use additional sheets to assess discrete habitat types at multiple sites in a project area

Include a map depicting locations of sample sites if assessing discrete habitats at multiple sites in a project area
A single sheet can be used for multiple sample sites if habitat is the same

Sample Site Description
Sample Site No.(s): 46

Water Resources at Sample Site				
Stream Type (# and length)	Ephemeral	Intermittent	Perennial	Describe existing condition of water sources:
	—	—	—	
Pools/Ponds (# and size)	0	Open and accessible to bats?		NA
		NA		
Wetlands (approx. ac.)	Permanent	Seasonal		
	—	—		

Forest Resources at Sample Site				
Closure/Density	Canopy (> 50')	Midstory (20-50')	Understory (<20')	1=1-10%, 2=11-20%, 3=21-40%, 4=41-60%, 5=61-80%, 6=81=100%
	1	3	4	
Dominant Species of Mature Trees	red oak, box elder, privet, sweet gum, black locust			
% Trees w/ Exfoliating Bark	0	0	0	
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)	
	40	30	30	
No. of Suitable Snags	0	0		

Standing dead trees with exfoliating bark, cracks, crevices, or hollows. Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BATS? NO

Additional Comments: Wooded fence row along eastern edge w/ large lot in SE corner

Attach aerial photo of project site with all forested areas labeled and a general description of the habitat

Photographic Documentation: habitat shots at edge and interior from multiple locations; understory/midstory/canopy; examples of potential suitable snags and live trees; water sources

APPENDIX A: PHASE 1 HABITAT ASSESSMENTS

Use additional sheets to assess discrete habitat types at multiple sites in a project area

Include a map depicting locations of sample sites if assessing discrete habitats at multiple sites in a project area
A single sheet can be used for multiple sample sites if habitat is the same

Sample Site Description
Sample Site No.(s): 49

Water Resources at Sample Site				
Stream Type (# and length)	Ephemeral	Intermittent	Perennial	Describe existing condition of water sources: NA
	—	—	—	
Pools/Ponds (# and size)	0	Open and accessible to bats? NA		
Wetlands (approx. ac.)	Permanent	Seasonal		
	—	—		

Forest Resources at Sample Site				
Closure/Density	Canopy (> 50')	Midstory (20-50')	Understory (<20')	1=1-10%, 2=11-20%, 3=21-40%, 4=41-60%, 5=61-80%, 6=81=100%
	1	3	4	
Dominant Species of Mature Trees	sweet gum, privet, E. red cedar crepe myrtle			
% Trees w/ Exfoliating Bark	0	0	0	0
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)	
	60	30	10	
No. of Suitable Snags	0	0		

Standing dead trees with exfoliating bark, cracks, crevices, or hollows. Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BATS? NO

Additional Comments: wood lot in residential yard

Attach aerial photo of project site with all forested areas labeled and a general description of the habitat

Photographic Documentation: habitat shots at edge and interior from multiple locations; understory/midstory/canopy; examples of potential suitable snags and live trees; water sources

APPENDIX A: PHASE 1 HABITAT ASSESSMENTS

Use additional sheets to assess discrete habitat types at multiple sites in a project area

Include a map depicting locations of sample sites if assessing discrete habitats at multiple sites in a project area
A single sheet can be used for multiple sample sites if habitat is the same

Sample Site Description
Sample Site No.(s): 50

Water Resources at Sample Site				
Stream Type (# and length)	Ephemeral	Intermittent	Perennial	Describe existing condition of water sources: NA
	—	—	—	
Pools/Ponds (# and size)	0	Open and accessible to bats? NA		
Wetlands (approx. ac.)	Permanent	Seasonal		
	—	—		

Forest Resources at Sample Site				
Closure/Density	Canopy (> 50')	Midstory (20-50')	Understory (<20')	1=1-10%, 2=11-20%, 3=21-40%, 4=41-60%, 5=61-80%, 6=81=100%
	2	2	2	
Dominant Species of Mature Trees	red oak, Tulip poplar, shagbark, sweetgum			
% Trees w/ Exfoliating Bark	0	0	1%	
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)	
	20	40	40	
No. of Suitable Snags	0	0		

Standing dead trees with exfoliating bark, cracks, crevices, or hollows. Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BATS? Yes

Additional Comments: Site is a wooded fence row along the north + expands to a large lot in NW corner. This corner is open w/ 10-15 large shagbarks

Attach aerial photo of project site with all forested areas labeled and a general description of the habitat

Photographic Documentation: habitat shots at edge and interior from multiple locations; understory/midstory/canopy; examples of potential suitable snags and live trees; water sources

APPENDIX A: PHASE 1 HABITAT ASSESSMENTS

Use additional sheets to assess discrete habitat types at multiple sites in a project area

Include a map depicting locations of sample sites if assessing discrete habitats at multiple sites in a project area
A single sheet can be used for multiple sample sites if habitat is the same

Sample Site Description
Sample Site No.(s): 54

Water Resources at Sample Site				
Stream Type (# and length)	Ephemeral	Intermittent	Perennial	Describe existing condition of water sources: eroded stream channel w/ no flow but open enough and gps for bats to access
	—	—	—	
Pools/Ponds (# and size)	0	Open and accessible to bats? Yes		
Wetlands (approx. ac.)	Permanent	Seasonal		
	—	—		

Forest Resources at Sample Site				
Closure/Density	Canopy (> 50 ')	Midstory (20-50')	Understory (<20')	1=1-10%, 2=11-20%, 3=21-40%, 4=41-60%, 5=61-80%, 6=81=100%
	1	1	3	
Dominant Species of Mature Trees	red oak, privet, sycamore			
% Trees w/ Exfoliating Bark	0	0	0	0
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)	
	5	15	80	
No. of Suitable Snags	0	0		

Standing dead trees with exfoliating bark, cracks, crevices, or hollows. Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BATS? NO

Additional Comments: Open area w/ large trees + creek. Some foraging + drinking areas but no PRT

Attach aerial photo of project site with all forested areas labeled and a general description of the habitat

Photographic Documentation: habitat shots at edge and interior from multiple locations; understory/midstory/canopy; examples of potential suitable snags and live trees; water sources

APPENDIX A: PHASE 1 HABITAT ASSESSMENTS

Use additional sheets to assess discrete habitat types at multiple sites in a project area

Include a map depicting locations of sample sites if assessing discrete habitats at multiple sites in a project area
A single sheet can be used for multiple sample sites if habitat is the same

Sample Site Description

Sample Site No.(s): 55 + 56

Water Resources at Sample Site

Stream Type (# and length)	Ephemeral	Intermittent	Perennial	Describe existing condition of water sources: NA
Pools/Ponds (# and size)	0	Open and accessible to bats? NA		
Wetlands (approx. ac.)	Permanent	Seasonal		

Forest Resources at Sample Site

Closure/Density	Canopy (> 50')	Midstory (20-50')	Understory (<20')	1=1-10%, 2=11-20%, 3=21-40%, 4=41-60%, 5=61-80%, 6=81=100%
	1	2	2	
Dominant Species of Mature Trees	red oak, sycamore, tulip poplar, sweetgum, Honeylocust			
% Trees w/ Exfoliating Bark	0	0	0	
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)	
	40	40	20	
No. of Suitable Snags	0	0		

Standing dead trees with exfoliating bark, cracks, crevices, or hollows. Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BATS? NO

Additional Comments: Wooded fence row along eastern boundary w/ some more wooded area in SW corner + small extension (site 56) into field.

Attach aerial photo of project site with all forested areas labeled and a general description of the habitat

Photographic Documentation: habitat shots at edge and interior from multiple locations; understory/midstory/canopy; examples of potential suitable snags and live trees; water sources

Use additional sheets to assess discrete habitat types at multiple sites in a project area

Include a map depicting locations of sample sites if assessing discrete habitats at multiple sites in a project area
A single sheet can be used for multiple sample sites if habitat is the same

Sample Site Description
Sample Site No.(s): 57

Water Resources at Sample Site				
Stream Type (# and length)	Ephemeral	Intermittent	Perennial	Describe existing condition of water sources: Laural creek canal. Large chanel w/ shallow stream
		-	1	
Pools/Ponds (# and size)		Open and accessible to bats?		
Wetlands (approx. ac.)	Permanent	Seasonal		

Forest Resources at Sample Site				
Closure/Density	Canopy (> 50')	Midstory (20-50')	Understory (<20')	1=1-10%, 2=11-20%, 3=21-40%, 4=41-60%, 5=61-80%, 6=81=100%
	2	4	6	
Dominant Species of Mature Trees	white oak, sycamore, river birch, box elder, privet			
% Trees w/ Exfoliating Bark	0	0	0	0
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)	
	75	20	5	
No. of Suitable Snags	0	0		

Standing dead trees with exfoliating bark, cracks, crevices, or hollows. Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BATS? NO

Additional Comments:
Forested area along Laural creek. The canal provides drinking + foraging areas but surrounding flood plane is cluttered w/ no PRTs

Attach aerial photo of project site with all forested areas labeled and a general description of the habitat

Photographic Documentation: habitat shots at edge and interior from multiple locations; understory/midstory/canopy; examples of potential suitable snags and live trees; water sources

APPENDIX A: PHASE 1 HABITAT ASSESSMENTS

Use additional sheets to assess discrete habitat types at multiple sites in a project area

Include a map depicting locations of sample sites if assessing discrete habitats at multiple sites in a project area

A single sheet can be used for multiple sample sites if habitat is the same

Sample Site Description
Sample Site No.(s): 58

Water Resources at Sample Site				
Stream Type (# and length)	Ephemeral	Intermittent	Perennial	Describe existing condition of water sources: Small stream w/ a few shallow pools
	—	1	—	
Pools/Ponds (# and size)	—	Open and accessible to bats?		
		NO		
Wetlands (approx. ac.)	Permanent	Seasonal		
	—	—		

Forest Resources at Sample Site				
Closure/Density	Canopy (> 50 ')	Midstory (20-50')	Understory (<20')	1=1-10%, 2=11-20%, 3=21-40%, 4=41-60%, 5=61-80%, 6=81=100%
	1	2	2	
Dominant Species of Mature Trees	red oak, white oak, river birch, sycamore, shagbark, sweetgum, hornbeam			
% Trees w/ Exfoliating Bark	0	0	<1%	
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)	
	30	30	40	
No. of Suitable Snags	0	0		

Standing dead trees with exfoliating bark, cracks, crevices, or hollows. Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BATS? Yes

Additional Comments: Wooded flood plain on SE corner of property w/ several large shagbarks + open mid story/canopy

Attach aerial photo of project site with all forested areas labeled and a general description of the habitat

Photographic Documentation: habitat shots at edge and interior from multiple locations; understory/midstory/canopy; examples of potential suitable snags and live trees; water sources

APPENDIX A: PHASE 1 HABITAT ASSESSMENTS

Use additional sheets to assess discrete habitat types at multiple sites in a project area

Include a map depicting locations of sample sites if assessing discrete habitats at multiple sites in a project area
A single sheet can be used for multiple sample sites if habitat is the same

Sample Site Description
Sample Site No.(s): 59

Water Resources at Sample Site				
Stream Type (# and length)	Ephemeral	Intermittent	Perennial	Describe existing condition of water sources:
	–	–	–	
Pools/Ponds (# and size)	0	Open and accessible to bats?		NA
		NA		
Wetlands (approx. ac.)	Permanent	Seasonal		
	–	–		

Forest Resources at Sample Site				
Closure/Density	Canopy (> 50')	Midstory (20-50')	Understory (<20')	1=1-10%, 2=11-20%, 3=21-40%, 4=41-60%, 5=61-80%, 6=81=100%
	1	2	3	
Dominant Species of Mature Trees	red oak, white oak, sycamore, sweetgum, shagbark			
% Trees w/ Exfoliating Bark	0	0	<1%	
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)	
	25	30	45	
No. of Suitable Snags	0	0		

Standing dead trees with exfoliating bark, cracks, crevices, or hollows. Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BATS? Yes

Additional Comments:
Western portion a bit altered w/ no PRT but it grows up and gets swampy as you move west w/ several highwaters for PRT

Attach aerial photo of project site with all forested areas labeled and a general description of the habitat

Photographic Documentation: habitat shots at edge and interior from multiple locations; understory/midstory/canopy; examples of potential suitable snags and live trees; water sources

APPENDIX A: PHASE 1 HABITAT ASSESSMENTS

Use additional sheets to assess discrete habitat types at multiple sites in a project area

Include a map depicting locations of sample sites if assessing discrete habitats at multiple sites in a project area
A single sheet can be used for multiple sample sites if habitat is the same

Sample Site Description
Sample Site No.(s): 60

Water Resources at Sample Site				
Stream Type (# and length)	Ephemeral	Intermittent	Perennial	Describe existing condition of water sources:
		—		
Pools/Ponds (# and size)	0	Open and accessible to bats? NA		NA
Wetlands (approx. ac.)	Permanent	Seasonal		
	—	—		

Forest Resources at Sample Site				
Closure/Density	Canopy (> 50')	Midstory (20-50')	Understory (<20')	1=1-10%, 2=11-20%, 3=21-40%, 4=41-60%, 5=61-80%, 6=81=100%
	2	3	3	
Dominant Species of Mature Trees	red maple winged elm sycamore			
% Trees w/ Exfoliating Bark	0	0	0	0
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)	
	20	70	10	
No. of Suitable Snags				

Standing dead trees with exfoliating bark, cracks, crevices, or hollows. Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BATS? No

Additional Comments: small even aged stand in middle of ag field

Attach aerial photo of project site with all forested areas labeled and a general description of the habitat

Photographic Documentation: habitat shots at edge and interior from multiple locations; understory/midstory/canopy; examples of potential suitable snags and live trees; water sources

Use additional sheets to assess discrete habitat types at multiple sites in a project area

Include a map depicting locations of sample sites if assessing discrete habitats at multiple sites in a project area

A single sheet can be used for multiple sample sites if habitat is the same

Sample Site Description

Sample Site No.(s): 6-1

Water Resources at Sample Site

Stream Type (# and length)	Ephemeral	Intermittent	Perennial	Describe existing condition of water sources: one intermittent stream, but no access for bats
	-	1	-	
Pools/Ponds (# and size)	-	Open and accessible to bats?		
		—		
Wetlands (approx. ac.)	Permanent	Seasonal		
	-	-		

Forest Resources at Sample Site

Closure/Density	Canopy (> 50')	Midstory (20-50')	Understory (<20')	1=1-10%, 2=11-20%, 3=21-40%, 4=41-60%, 5=61-80%, 6=81-100%
	1	2	6	
Dominant Species of Mature Trees	red oak, white ash, poplar			
% Trees w/ Exfoliating Bark	-	-	-	
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)	
	40	40	20	
No. of Suitable Snags				

Standing dead trees with exfoliating bark, cracks, crevices, or hollows. Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BATS? NO

Additional Comments:

Attach aerial photo of project site with all forested areas labeled and a general description of the habitat

Photographic Documentation: habitat shots at edge and interior from multiple locations; understory/midstory/canopy; examples of potential suitable snags and live trees; water sources

APPENDIX A: PHASE 1 HABITAT ASSESSMENTS

Use additional sheets to assess discrete habitat types at multiple sites in a project area

Include a map depicting locations of sample sites if assessing discrete habitats at multiple sites in a project area
A single sheet can be used for multiple sample sites if habitat is the same

Sample Site Description
Sample Site No.(s): 62

Water Resources at Sample Site				
Stream Type (# and length)	Ephemeral	Intermittent	Perennial	Describe existing condition of water sources: NA
	—	—	—	
Pools/Ponds (# and size)	—	Open and accessible to bats? NA		
Wetlands (approx. ac.)	Permanent	Seasonal		
	—	—		

Forest Resources at Sample Site				
Closure/Density	Canopy (> 50')	Midstory (20-50')	Understory (<20')	1=1-10%, 2=11-20%, 3=21-40%, 4=41-60%, 5=61-80%, 6=81=100%
	2	4	5	
Dominant Species of Mature Trees	white oak red oak hickory			
% Trees w/ Exfoliating Bark	0	0	0	0
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)	
	30	60	10	
No. of Suitable Snags				

Standing dead trees with exfoliating bark, cracks, crevices, or hollows. Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BATS? NO

Additional Comments: Wooded island in ag field, cluttered mid story

Attach aerial photo of project site with all forested areas labeled and a general description of the habitat

Photographic Documentation: habitat shots at edge and interior from multiple locations; understory/midstory/canopy; examples of potential suitable snags and live trees; water sources

APPENDIX A: PHASE 1 HABITAT ASSESSMENTS

Use additional sheets to assess discrete habitat types at multiple sites in a project area

Include a map depicting locations of sample sites if assessing discrete habitats at multiple sites in a project area

A single sheet can be used for multiple sample sites if habitat is the same

Sample Site Description

Sample Site No.(s): 63

Water Resources at Sample Site

Stream Type (# and length)	Ephemeral	Intermittent	Perennial
	1	–	–
Pools/Ponds (# and size)	0	Open and accessible to bats?	
		NA	
Wetlands (approx. ac.)	Permanent	Seasonal	
	–	–	

Describe existing condition of water sources: dry shallow channel

Forest Resources at Sample Site

Closure/Density	Canopy (> 50')	Midstory (20-50')	Understory (<20')	1=1-10%, 2=11-20%, 3=21-40%, 4=41-60%, 5=61-80%, 6=81=100%
	1	3	4	
Dominant Species of Mature Trees	red oak sweetgum white oak E. red cedar			
% Trees w/ Exfoliating Bark	6	0	0	0
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)	
	60	30	10	
No. of Suitable Snags	0	0		

Standing dead trees with exfoliating bark, cracks, crevices, or hollows. Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BATS? NO

Additional Comments: Clustered even age stand w/ several cedars in the northern half

Attach aerial photo of project site with all forested areas labeled and a general description of the habitat

Photographic Documentation: habitat shots at edge and interior from multiple locations; understory/midstory/canopy; examples of potential suitable snags and live trees; water sources

APPENDIX A: PHASE 1 HABITAT ASSESSMENTS

Use additional sheets to assess discrete habitat types at multiple sites in a project area

Include a map depicting locations of sample sites if assessing discrete habitats at multiple sites in a project area
A single sheet can be used for multiple sample sites if habitat is the same

Sample Site Description
Sample Site No.(s): 64

Water Resources at Sample Site				
Stream Type (# and length)	Ephemeral	Intermittent	Perennial	Describe existing condition of water sources:
	—	—	—	
Pools/Ponds (# and size)	0	Open and accessible to bats?		NA
		NA		
Wetlands (approx. ac.)	Permanent	Seasonal		
	—	—		

Forest Resources at Sample Site				
Closure/Density	Canopy (> 50')	Midstory (20-50')	Understory (<20')	1=1-10%, 2=11-20%, 3=21-40%, 4=41-60%, 5=61-80%, 6=81=100%
	2	3	6	
Dominant Species of Mature Trees	White oak Hackberry Red oak			
% Trees w/ Exfoliating Bark				
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)	
	40	40	20	
No. of Suitable Snags				

Standing dead trees with exfoliating bark, cracks, crevices, or hollows. Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BATS? NO

Additional Comments: Wood island in ag field w/ [illegible] canopy, and [illegible]

Attach aerial photo of project site with all forested areas labeled and a general description of the habitat

Photographic Documentation: habitat shots at edge and interior from multiple locations; understory/midstory/canopy; examples of potential suitable snags and live trees; water sources

APPENDIX A: PHASE 1 HABITAT ASSESSMENTS

Use additional sheets to assess discrete habitat types at multiple sites in a project area

Include a map depicting locations of sample sites if assessing discrete habitats at multiple sites in a project area
A single sheet can be used for multiple sample sites if habitat is the same

Sample Site Description
Sample Site No.(s): 65

Water Resources at Sample Site				
Stream Type (# and length)	Ephemeral	Intermittent	Perennial	Describe existing condition of water sources:
	—	—	—	
Pools/Ponds (# and size)	—	Open and accessible to bats?		NA
		NA		
Wetlands (approx. ac.)	Permanent	Seasonal		
	—	—		

Forest Resources at Sample Site				
Closure/Density	Canopy (> 50 ')	Midstory (20-50')	Understory (<20')	1=1-10%, 2=11-20%, 3=21-40%, 4=41-60%, 5=61-80%, 6=81=100%
	1	4	6	
Dominant Species of Mature Trees	white oak, red oak, American hornbeam, sycamore, winged elm			
% Trees w/ Exfoliating Bark	0	0	0	0
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)	
	60	20	20	
No. of Suitable Snags	0	0		

Standing dead trees with exfoliating bark, cracks, crevices, or hollows. Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BATS? NO

Additional Comments: Very cluttered

Attach aerial photo of project site with all forested areas labeled and a general description of the habitat

Photographic Documentation: habitat shots at edge and interior from multiple locations; understory/midstory/canopy; examples of potential suitable snags and live trees; water sources

Use additional sheets to assess discrete habitat types at multiple sites in a project area

Include a map depicting locations of sample sites if assessing discrete habitats at multiple sites in a project area

A single sheet can be used for multiple sample sites if habitat is the same

Sample Site Description

Sample Site No.(s): 66

Water Resources at Sample Site

Stream Type (# and length)	Ephemeral	Intermittent	Perennial	Describe existing condition of water sources: eroded muddy channel w/ a few pools, no flow
	0	1	—	
Pools/Ponds (# and size)	0	Open and accessible to bats?		
		NA /		
Wetlands (approx. ac.)	Permanent	Seasonal		
	—	—		

Forest Resources at Sample Site

Closure/Density	Canopy (> 50')	Midstory (20-50')	Understory (<20')	1=1-10%, 2=11-20%, 3=21-40%, 4=41-60%, 5=61-80%, 6=81-100%
	3	4	5	
Dominant Species of Mature Trees	white oak, sweetgum, river birch			
% Trees w/ Exfoliating Bark	0	0	0	
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)	
	30	50	20	
No. of Suitable Snags	0	0		

Standing dead trees with exfoliating bark, cracks, crevices, or hollows. Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BATS? NO

Additional Comments:

—

Attach aerial photo of project site with all forested areas labeled and a general description of the habitat

Photographic Documentation: habitat shots at edge and interior from multiple locations; understory/midstory/canopy; examples of potential suitable snags and live trees; water sources

Use additional sheets to assess discrete habitat types at multiple sites in a project area

Include a map depicting locations of sample sites if assessing discrete habitats at multiple sites in a project area
A single sheet can be used for multiple sample sites if habitat is the same

Sample Site Description
Sample Site No.(s): 67

Water Resources at Sample Site				
Stream Type (# and length)	Ephemeral	Intermittent	Perennial	Describe existing condition of water sources: small shallow creek w/ trees along southern border, too cluttered for bats
	—	1	—	
Pools/Ponds (# and size)	0	Open and accessible to bats? NO		
Wetlands (approx. ac.)	Permanent	Seasonal		
	—	—		

Forest Resources at Sample Site				
Closure/Density	Canopy (> 50')	Midstory (20-50')	Understory (<20')	1=1-10%, 2=11-20%, 3=21-40%, 4=41-60%, 5=61-80%, 6=81=100%
	2	3	4	
Dominant Species of Mature Trees	red oak, white oak, shagbark Hickory			
% Trees w/ Exfoliating Bark	0	0	<1%	0
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)	
	30	40	30	
No. of Suitable Snags	0	6		

Standing dead trees with exfoliating bark, cracks, crevices, or hollows. Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BATS? Yes

Additional Comments: Southern edge of larger forested tract. A bit cluttered in mid-story & understory but 5 shagbarks in the SW corner provide PRT

Attach aerial photo of project site with all forested areas labeled and a general description of the habitat

Photographic Documentation: habitat shots at edge and interior from multiple locations; understory/midstory/canopy; examples of potential suitable snags and live trees; water sources

APPENDIX A: PHASE 1 HABITAT ASSESSMENTS

Use additional sheets to assess discrete habitat types at multiple sites in a project area

Include a map depicting locations of sample sites if assessing discrete habitats at multiple sites in a project area

A single sheet can be used for multiple sample sites if habitat is the same

Sample Site Description

Sample Site No.(s): 68

Water Resources at Sample Site

Stream Type (# and length)	Ephemeral	Intermittent	Perennial	Describe existing condition of water sources: Laural Creek Canal ~20' wide channel w/water ~6' wide + shallow
		-	1	
Pools/Ponds (# and size)	0	Open and accessible to bats?		
		Yes		
Wetlands (approx. ac.)	Permanent	Seasonal		
	—	—		

Forest Resources at Sample Site

Closure/Density	Canopy (> 50')	Midstory (20-50')	Understory (<20')	1=1-10%, 2=11-20%, 3=21-40%, 4=41-60%, 5=61-80%, 6=81=100%
	2	3	3	
Dominant Species of Mature Trees	river birch, Tulip Poplar, sycamore			
% Trees w/ Exfoliating Bark	0	0	0	
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)	
	20	20	60	
No. of Suitable Snags	0	0		

Standing dead trees with exfoliating bark, cracks, crevices, or hollows. Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BATS? No

Additional Comments: Tree line + Laural creek canal. Laural creek provides good foraging & drinking area but no PRT in the project area

Attach aerial photo of project site with all forested areas labeled and a general description of the habitat

Photographic Documentation: habitat shots at edge and interior from multiple locations; understory/midstory/canopy; examples of potential suitable snags and live trees; water sources

Use additional sheets to assess discrete habitat types at multiple sites in a project area

Include a map depicting locations of sample sites if assessing discrete habitats at multiple sites in a project area
A single sheet can be used for multiple sample sites if habitat is the same

Sample Site Description
Sample Site No.(s): 69

Water Resources at Sample Site				
Stream Type (# and length)	Ephemeral	Intermittent	Perennial	Describe existing condition of water sources: stagnant channel eroded by cows
	—	1	—	
Pools/Ponds (# and size)	0	Open and accessible to bats? NO		
Wetlands (approx. ac.)	Permanent	Seasonal		
	—	—		

Forest Resources at Sample Site				
Closure/Density	Canopy (> 50')	Midstory (20-50')	Understory (<20')	1=1-10%, 2=11-20%, 3=21-40%, 4=41-60%, 5=61-80%, 6=81=100%
	2	3	4	
Dominant Species of Mature Trees	Tulip poplar, red oak	Hackberry, sweetgum	Am. Hornbeam, sycamore	
% Trees w/ Exfoliating Bark	0	0	0	0
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)	
	50	30	20	
No. of Suitable Snags	0	0		

Standing dead trees with exfoliating bark, cracks, crevices, or hollows. Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BATS? NO

Additional Comments: Wood lot between cow pasture & cotton fields. Fairly young stand, but still open, clear of vines for the most part but no PRT

Attach aerial photo of project site with all forested areas labeled and a general description of the habitat

Photographic Documentation: habitat shots at edge and interior from multiple locations; understory/midstory/canopy; examples of potential suitable snags and live trees; water sources

APPENDIX A: PHASE 1 HABITAT ASSESSMENTS

Use additional sheets to assess discrete habitat types at multiple sites in a project area

Include a map depicting locations of sample sites if assessing discrete habitats at multiple sites in a project area
A single sheet can be used for multiple sample sites if habitat is the same

Sample Site Description
Sample Site No.(s): 71

Water Resources at Sample Site				
Stream Type (# and length)	Ephemeral	Intermittent	Perennial	Describe existing condition of water sources:
	—	—	—	
Pools/Ponds (# and size)	—	Open and accessible to bats?		NA
		NA		
Wetlands (approx. ac.)	Permanent	Seasonal		
	—	—		

Forest Resources at Sample Site				
Closure/Density	Canopy (> 50')	Midstory (20-50')	Understory (<20')	1=1-10%, 2=11-20%, 3=21-40%, 4=41-60%, 5=61-80%, 6=81=100%
	1	1	1	
Dominant Species of Mature Trees	red oak, sweet gum, tulip poplar			
% Trees w/ Exfoliating Bark	0	0	0	0
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)	
	0	10	90	
No. of Suitable Snags	0	0		

Standing dead trees with exfoliating bark, cracks, crevices, or hollows. Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BATS? NO

Additional Comments: Open pasture wood lot behind a residence, Could provide foraging areas but no PRT

1 pic on Samsung

Attach aerial photo of project site with all forested areas labeled and a general description of the habitat

Photographic Documentation: habitat shots at edge and interior from multiple locations; understory/midstory/canopy; examples of potential suitable snags and live trees; water sources

APPENDIX A: PHASE 1 HABITAT ASSESSMENTS

Use additional sheets to assess discrete habitat types at multiple sites in a project area

Include a map depicting locations of sample sites if assessing discrete habitats at multiple sites in a project area

A single sheet can be used for multiple sample sites if habitat is the same

Sample Site Description
Sample Site No.(s): 72

Water Resources at Sample Site				
Stream Type (# and length)	Ephemeral	Intermittent	Perennial	Describe existing condition of water sources: dry muddy creek on ~~west~~ eastern half. Filled w/ water after levee rd.
	—	1	—	
Pools/Ponds (# and size)	0	Open and accessible to bats?		
		Yes		
Wetlands (approx. ac.)	Permanent	Seasonal		
	—	—		

Forest Resources at Sample Site				
Closure/Density	Canopy (> 50')	Midstory (20-50')	Understory (<20')	1=1-10%, 2=11-20%, 3=21-40%, 4=41-60%, 5=61-80%, 6=81=100%
	2	3	5	
Dominant Species of Mature Trees	red oak	tulip	sycamore	wych elm, hop hornbeam
% Trees w/ Exfoliating Bark	0	0	0	
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)	
	15	15	70	
No. of Suitable Snags	0	0		

Standing dead trees with exfoliating bark, cracks, crevices, or hollows. Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BATS? No

Additional Comments: strip of woods along creek, some drinking & foraging areas but no PRT

? pics on Sunny

Attach aerial photo of project site with all forested areas labeled and a general description of the habitat

Photographic Documentation: habitat shots at edge and interior from multiple locations; understory/midstory/canopy; examples of potential suitable snags and live trees; water sources

APPENDIX A: PHASE 1 HABITAT ASSESSMENTS

Use additional sheets to assess discrete habitat types at multiple sites in a project area

Include a map depicting locations of sample sites if assessing discrete habitats at multiple sites in a project area

A single sheet can be used for multiple sample sites if habitat is the same

Sample Site Description
Sample Site No.(s): _____ 73

Water Resources at Sample Site				
Stream Type (# and length)	Ephemeral	Intermittent	Perennial	Describe existing condition of water sources: eroded channel w/ steep banks in places but some areas accessible
	—	—	+	
Pools/Ponds (# and size)	0	Open and accessible to bats? Yes		
Wetlands (approx. ac.)	Permanent	Seasonal		
	—	—		

Forest Resources at Sample Site				
Closure/Density	Canopy (> 50')	Midstory (20-50')	Understory (<20')	1=1-10%, 2=11-20%, 3=21-40%, 4=41-60%, 5=61-80%, 6=81=100%
	1	3	3	
Dominant Species of Mature Trees	red oak, sycamore, sweetgum			
% Trees w/ Exfoliating Bark	0	0	0	
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)	
	30	20	50	
No. of Suitable Snags				

Standing dead trees with exfoliating bark, cracks, crevices, or hollows. Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BATS? NO

Additional Comments: Wooded creek corridor. Good drinking + foraging area but no PRT

Attach aerial photo of project site with all forested areas labeled and a general description of the habitat

Photographic Documentation: habitat shots at edge and interior from multiple locations; understory/midstory/canopy; examples of potential suitable snags and live trees; water sources

APPENDIX A: PHASE 1 HABITAT ASSESSMENTS

Use additional sheets to assess discrete habitat types at multiple sites in a project area

Include a map depicting locations of sample sites if assessing discrete habitats at multiple sites in a project area
A single sheet can be used for multiple sample sites if habitat is the same

Sample Site Description
Sample Site No.(s): 74

Water Resources at Sample Site				
Stream Type (# and length)	Ephemeral	Intermittent	Perennial	Describe existing condition of water sources:
	—	—	—	
Pools/Ponds (# and size)	0	Open and accessible to bats? NA		NA
Wetlands (approx. ac.)	Permanent	Seasonal		
	—	—		

Forest Resources at Sample Site				
Closure/Density	Canopy (> 50')	Midstory (20-50')	Understory (<20')	1=1-10%, 2=11-20%, 3=21-40%, 4=41-60%, 5=61-80%, 6=81=100%
	2	3	4	
Dominant Species of Mature Trees	red oak, white oak	willow oak, AM Elm	sycam	
% Trees w/ Exfoliating Bark	0	0	0	0
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)	
	30	50	20	
No. of Suitable Snags	0	0		

Standing dead trees with exfoliating bark, cracks, crevices, or hollows. Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BATS? No

Additional Comments: Bottom edge of large wooded tract. Cluttered w/ no PRT. Associated island of trees to south more open but no PRT

Attach aerial photo of project site with all forested areas labeled and a general description of the habitat

Photographic Documentation: habitat shots at edge and interior from multiple locations; understory/midstory/canopy; examples of potential suitable snags and live trees; water sources

Tennessee Valley Authority, 400 West Summit Hill Drive, Knoxville, Tennessee 37902

June 11, 2019

Mr. Lee Andrews
Field Supervisor
U. S. Fish and Wildlife Service
446 Neal Street
Cookeville, Tennessee 38501

Dear Mr. Andrews:

TENNESSEE VALLEY AUTHORITY (TVA) YUM YUM SOLAR FACILITY, FAYETTE COUNTY, CONCURRENCE REQUEST

TVA has entered into a Power Purchase Agreement with Yum Yum Solar LLC (Yum Yum), a subsidiary of Invenergy Solar Development North America LLC. TVA proposes to purchase the Energy Output and Other Project Attributes from a solar generation facility that Yum Yum is developing, and will own and operate Yum Yum Solar Energy Center located in Fayette County, Tennessee ("the Project"). The project will have a capacity of up to 147 megawatts. The Yum Yum Solar facility property is approximately 4,000 contiguous acres on 25 individual tracts of land. The total Project action area would be approximately 2,876 acres of land, with approximately 1,005 acres of this for the solar panels themselves. Arrays would be placed on a racking system situated on piles driven into the ground, thereby minimizing disturbance to the ground itself. Proposed actions (installation of solar panels, collection line, construction of laydown yard, substation, buildings, and switching station) would disturb approximately 67.4 acres of forest, and 1,000 acres of agricultural lands (cultivated crops). Best Management Practices would be used around streams. The only impacts anticipated to streams would be from installation of culverts.

Review of the TVA Regional Natural Heritage database, and the U.S. Fish and Wildlife Service IPaC website indicated two species listed as endangered, threatened, candidate, or delisted and monitored under the Endangered Species Act are reported from Fayette County, Tennessee, and may occur within the Project action area. Indiana bat, and northern long-eared bat (NLEB) have the potential to occur within Fayette County based on known range. No federally designated critical habitats for these species are present within or adjacent to the Project action area, therefore no adverse modification of critical habitats would occur.

Copperhead Consulting conducted Phase 1 Habitat Assessments (2018 Range-Wide Indiana Bat Summer Survey Guidelines) on March 27-29, 2019. Approximately 477 acres of suitable summer roosting habitat for both Indiana bat and NLEB was identified on the Project action area. Three hundred and twenty-five additional acres were identified as potentially suitable summer roosting habitat for NLEB only based on the small size of the identified roosting trees. See attached Figures 3A and 3B. Foraging habitat for both species exists within and around

forested areas. Water features suitable for drinking and foraging were identified in ten woodlots within the project action area.

There are no known caves located within three miles of the Project action area. The closest known record of Indiana bat is a maternity colony in Holly Springs National Forest in Benton County, Mississippi, approximately 34 miles away. The closest known record of NLEB is from a 2014 mist netting event approximately 71 miles away in Hardin County, Tennessee.

According to the USFWS map of Indiana Bat Sites in Tennessee (https://www.fws.gov/cookeville/pdfs/indiana_bat_6_27_18.pdf) and the Northern Long-eared Bat Sites in Tennessee and within 20 Miles (Conservation Strategy for Forest-dwelling Bats in Tennessee, https://www.fws.gov/cookeville/pdfs/TN_Conserv_Strat_forest_dwelling_bats_171005.pdf), the proposed action area does not occur in any known summer or winter habitat for Indiana bat or NLEB.

In order to avoid impacts to potential Indiana bat habitat, the project will avoid clearing summer roosting habitat for the Indiana bat. No known NLEB maternity roosting sites are present within or adjacent to the Project action area. No known NLEB hibernacula are present within 0.25 miles of the Project action area. An approximate 67.4 acres of forest identified as potential summer roosting habitat for the NLEB may be impacted; however, all tree removal would occur outside of the time (June 1 - July 31) when northern long-eared bat pups may be present in maternity roosts. Therefore, TVA has determined that while removal of suitable roosting habitat would have indirect adverse effects on northern long-eared bat and result in 'take' as defined in the Endangered Species Act (ESA), this 'take' is excepted from ESA Section 9 Take Prohibitions. Determinations regarding potential effects on NLEB were made per the Key to Northern Long-Eared Bat 4(d) Rule for Federal Actions that May Affect Northern Long-Eared Bats (USFWS - January 2016) and the Programmatic Biological Opinion on Final 4(d) Rule for the Northern Long-Eared Bat and Activities Excepted from Take Prohibitions (2016 BO).

As mentioned above, the proposed project is not within an area of known habitat for either Indiana bat or NLEB. No suitable summer roosting habitat for Indiana bat would be impacted. Therefore, TVA has determined that the proposed project would not affect Indiana bat. Based on communications from the Cookeville USFWS office on March 8, 2019, at this time projects requiring tree clearing outside of known Indiana bat occurrence buffers do not require formal consultation with the Cookeville USFWS office. That communication also indicates that new information or guidance resulting in changes to this method would be provided to TVA in writing.

TVA requests confirmation from your office that any incidental take of NLEB (as measured by removal of suitable roosting habitat) resulting from this action is covered by the 2016 BO. TVA also respectfully requests acknowledgement that we have followed proper procedures under current Section 7 ESA guidance for impacts to Indiana bat and that TVA's obligations regarding ESA compliance are fulfilled.

Should you have any questions or wish to discuss the project in more detail, please contact Liz Hamrick at (865) 632-4011.

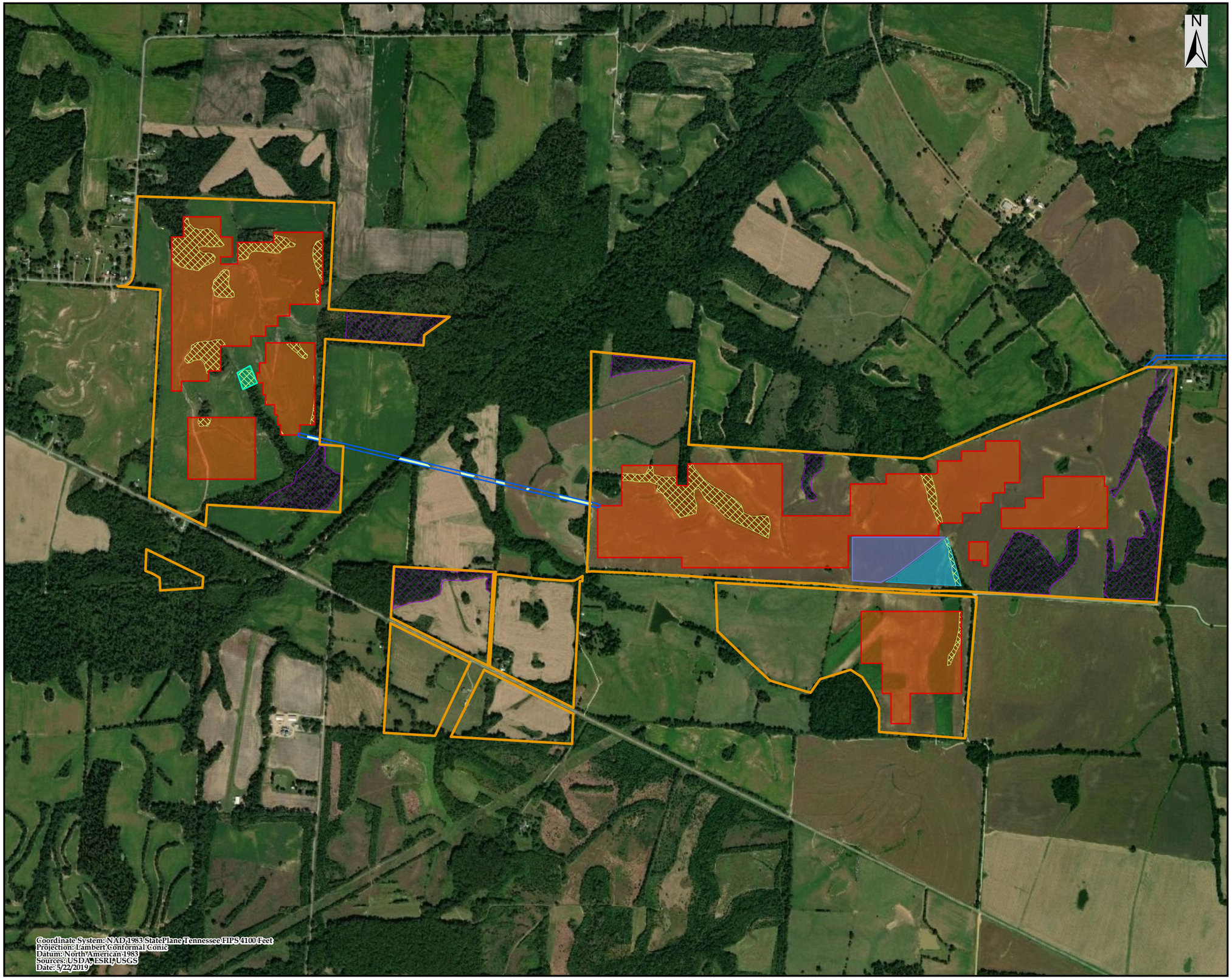
Sincerely,

John T. Baxter, Jr.
Manager
Biological Compliance

EBH:ABM
Enclosures

INTERNAL COPIES, NOT INCLUDED WITH OUTBOUND LETTER:

John T. Baxter, WT 11C-K
Travis A. Giles, BR 2N-C
Elizabeth B. Hamrick, WT 11C-K
Susan R. Jacks, WT 11C-K
ECM, WT CA-K



COPPERHEAD
ENVIRONMENTAL CONSULTING

FIGURE 3A:
Impacted MYSE Roosting Habitat on the Proposed Yum Yum Solar Site Project, Fayette County, TN

Legend

- Project Boundary
- UG Collection Line ROW
- Impacted Potential MYSE Roosting Habitat (35.68 ac)
- Potential Indiana Bat Roosting Habitat
- Laydown Yard
- Planned TVA Substation
- Road Corridor
- Racking

**Project total impacted MYSE roosting habitat = 67.39 ac*
***Impacts to Indiana bat habitat as a result of the collection lines will be avoided by boring.*

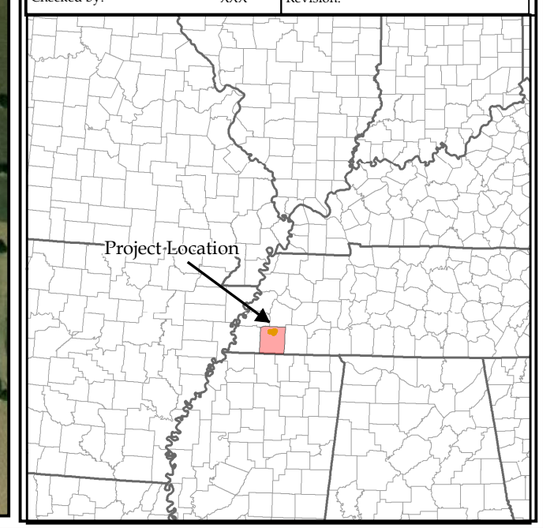
0 1,800 3,600
Feet

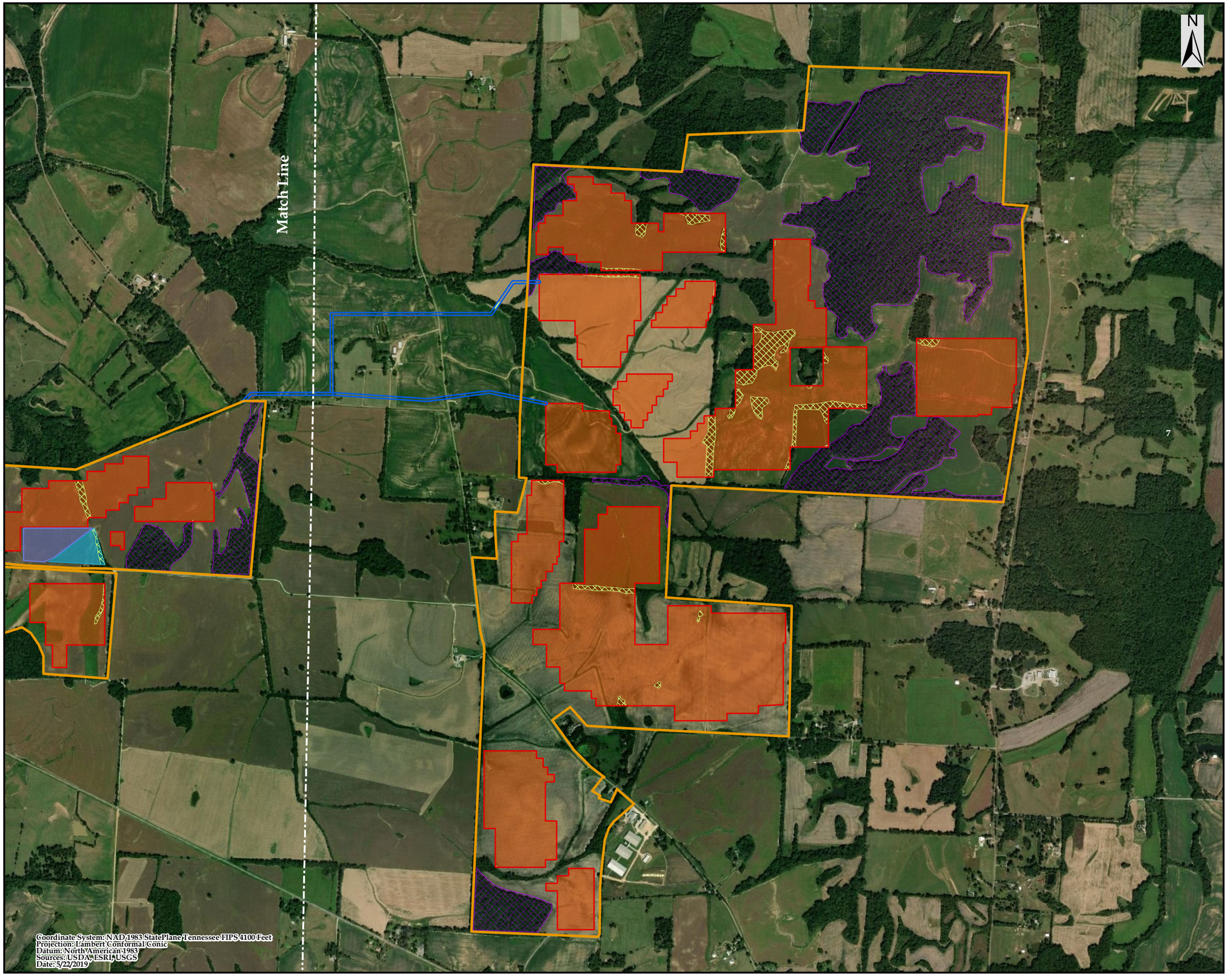
Scale: 1 in = 1,250 ft

Prepared by :

Copperhead Environmental Consulting, Inc.
3908 Gallatin Pike
Nashville, TN 37216

Drawn by:	CWM	Date:	5/22/2019
Checked by:	XXX	Revision:	





COPPERHEAD
ENVIRONMENTAL CONSULTING

FIGURE 3B:
Impacted MYSE Roosting Habitat on the Proposed Yum Yum Solar Site Project, Fayette County, TN

Legend

- Project Boundary
- UG Collection Line ROW
- Impacted Potential MYSE Roosting Habitat (31.71 ac)
- Potential Indiana Bat Roosting Habitat
- Laydown Yard
- Planned TVA Substation
- Racking

**Project total impacted MYSE roosting habitat = 67.39 ac*
***Impacts to Indiana bat habitat as a result of the collection lines will be avoided by boring.*

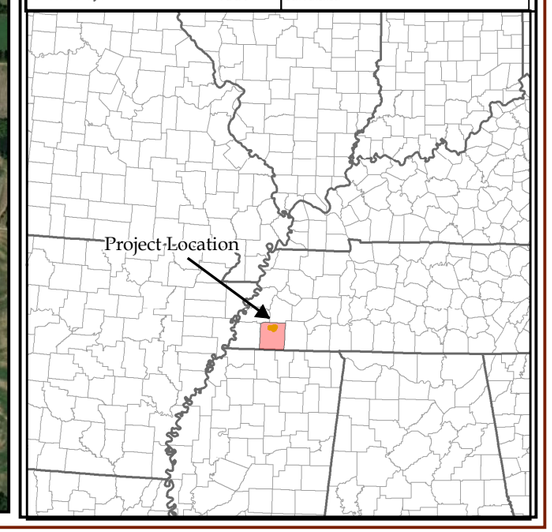
0 2,550 5,100
Feet

Scale: 1 in = 1,667 ft

Prepared by :

Copperhead Environmental Consulting, Inc.
3908 Gallatin Pike
Nashville, TN 37216

Drawn by:	CWM	Date:	5/22/2019
Checked by:	XXX	Revision:	



From:	Hamrick, Elizabeth Burton
To:	Dustin Boles (dustin_boles@fws.gov)
Cc:	Baxter, John Tracy
Subject:	Yum Yum Solar
Date:	Friday, June 21, 2019 11:33:00 AM

Hi Dustin,
Per our conversation, we would like to revise our determinations regarding potential impacts to bats for the Yum Yum Solar Facility project that was submitted to your office for concurrence on 6/12/19. TVA has determined that the proposed project would not affect the Indiana bat due to avoidance of all suitable roosting habitat for this species. TVA also has determined that a "may affect not likely to adversely affect" determination is appropriate for northern long-eared bat as suitable roosting habitat would be removed but this would be done outside of pup season.

Thank you for the discussion,

Liz Hamrick
Terrestrial Zoologist
Biological Compliance

400 W Summit Hill Dr. WT 11C-K
Knoxville, TN 37902

865-632-4011 (w)
ecburton@tva.gov

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Tennessee ES Office
446 Neal Street
Cookeville, Tennessee 38501

June 21, 2019

John T. Baxter, Jr.
Manager
Endangered Species Act Compliance
Tennessee Valley Authority
400 W Summit Hill Dr.
Knoxville, Tennessee 37902

Subject: FWS# 2019-CPA-0543. Tennessee Valley Authority – Power Purchase Agreement with Yum Yum Solar LLC in Fayette County, Tennessee.

Dear Mr. Baxter:

Thank you for your correspondence dated June 11, 2019, regarding the Tennessee Valley Authority's (TVA) proposal to execute a Power Purchase Agreement (PPA) to purchase the electric power generated by the proposed Yum Yum Solar Facility in Fayette County, Tennessee. The TVA has defined the action area to encompass approximately 2,876 acres, which includes approximately 1,005 acres of solar panels and other necessary infrastructure associate with facility operation. Once operational, the proposed facility would have the capacity to produce up to 147 megawatts. The U.S. Fish and Wildlife Service (Service) personnel have reviewed the submitted information, and we offer the following comments.

Your correspondence includes the findings of a forest-dwelling bat habitat assessment, which was completed by Copperhead Environmental Consulting in accordance with the 2018 Range-wide Indiana Bat Survey Guidelines. The assessment documented approximately 477 acres of suitable summer roosting habitat for both the Indiana bat (*Myotis sodalis*) and northern long-eared bat (*Myotis septentrionalis*) within the action area. An additional 325 acres was identified to only be suitable for the northern long-eared bat due to the small size of potential roosting trees and solitary roosting habitats of the species. The TVA has committed to avoid suitable Indiana bat habitat during tree removal activities. However, impacts to approximately 67.4 acres of suitable habitat for northern long-eared bat may occur. Although impacts to suitable northern long-eared bat habitat are expected, the action area is not located within any known occurrence buffers for rare, forest-dwelling bat species. Furthermore, we are unaware of any other information that would suggest the northern long-eared bat occupies this site and we would not anticipate tree removal activities to adversely affect the species.

Upon consideration of the provided information, the Service concurs with TVA's may affect, but is not likely to adversely affect determination for the northern long-eared bat. We also acknowledge your no effect determination for the Indiana bat, which is based on avoiding any impacts to suitable habitat for this species. We note, however, that collection records available to the Service may not be all-inclusive. Our database is a compilation of collection records made available by various individuals and resource agencies. This information is seldom based on comprehensive surveys of all potential habitat and thus does not necessarily provide conclusive evidence that protected species are present or absent at a specific locality. Obligations under section 7 of the Act must be reconsidered if (1) new information reveals impacts of the action that may affect listed species or critical habitat in a manner not previously considered, (2) the action is subsequently modified to include activities which were not considered during this consultation, or (3) new species are listed or critical habitat designated that might be affected by the action.

We take this opportunity to recommend that the project proponent collaborate with the Service and other interested parties to incorporate habitat considerations for pollinators. Considering the size of the action area, this solar development offers considerable potential to enhance pollinator habitat. Therefore, the Service is eager to provide technical assistance regarding the design, implementation, and management of habitat within the action area. Minimum efforts to conserve pollinators could include following measures: re-vegetate disturbed areas using native seed mixtures containing milkweed. Taller growing pollinator plant species could be planted around the periphery of the site, and anywhere on the site where mowing would be restricted.

Thank you for the opportunity to comment on the proposed action. If you have any questions regarding the information which we have provided or the project proponent wishes to seek technical assistance with the incorporation of pollinator recommendations, please contact Dustin Boles at 931/525-4984, or by email at *dustin_boles@fws.gov.*

Sincerely,

Robert E. Sykes
Acting Field Supervisor

Tennessee Valley Authority, 400 West Summit Hill Drive, Knoxville, TN 37902

March 6, 2019

Mr. E. Patrick McIntyre, Jr.
Executive Director
and State Historic Preservation Officer
Tennessee Historical Commission
2941 Lebanon Road
Nashville, Tennessee 37243-0442

Dear Mr. McIntyre:

TENNESSEE VALLEY AUTHORITY (TVA) INITIATION OF CONSULATATION FOR THE PROPOSED YUM YUM SOLAR ARRAY, COUNTY, FAYETTE COUNTY, TENNESSEE (-89.401709 35.325456)

TVA proposes to enter into a Power Purchase Agreement (PPA) with Yum Yum Solar LLC, a subsidiary of Invenergy Solar Project Development LLC, to purchase the electric power generated by a proposed solar photovoltaic (PV) facility in Fayette County, Tennessee. The proposed Yum Yum solar facility would be constructed and operated by Yum Yum Solar LLC and would produce 147 Megawatts. The proposed Yum Yum solar facility's project boundary is approximately 4,000 contiguous acres on 25 individual tracts located in a rural area of Fayette County, Tennessee, southwest of the community of Yum Yum. The agreements provide Invenergy the rights to construct the solar facility on the 25 tracts. The solar project would disturb approximately 1,800 acres of the 4,000-acre project boundary. The disturbance would be minimal where the arrays would be located due to the racking system being situated on piles driven into the ground. The project would consist of the following primary components: a solar array containing monocrystalline photovoltaic panels attached to ground-mounted single-axis trackers; central inverters; medium voltage and main power transformers; and all associated cabling and safety equipment. The main power transformer would be located within the project substation and would interconnect with TVA's planned 161-kilovolt switching station that is located on one of the parcels.

TVA determined the area of potential effects (APE) to be the footprint where ground disturbance could occur as a result of the undertaking and the indirect/visual APE to be the 0.5 mile radius of the project area and within the visual line of site (Figures 1 and 2). For your review please find enclosed HDR's research design for the Phase I Cultural Resources survey. Pursuant to 36 CFR § 800.4(b)(1), TVA finds that the design presented here is a reasonable and good faith effort to carry out identification efforts.

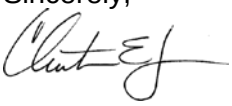
By this letter, TVA is initiating consultation regarding the proposed undertaking. TVA is proposing to do a Phase I Cultural Resources survey of the APE. Due to the size and scope of

the project TVA proposes to proceed under phases as provided under 36 CFR § 800.4(b)(2) and § 800.5(c)(1).

Pursuant to 36 C.F.R. Part 800.3(f)(2), TVA is consulting with federally recognized Indian tribes regarding historic properties within the proposed project's APE that may be of religious and cultural significance and are eligible for the National Register of Historic Places.

Please contact Michaelyn Harle by telephone (865) 632-2248 or by email, mharle@tva.gov with your comments.

Sincerely,



Clinton E. Jones
Manager
Cultural Compliance

MSH:ABM
Enclosures
cc (Enclosures):
Ms. Jennifer Barnett
Tennessee Division of Archaeology
1216 Foster Avenue, Cole Bldg. #3
Nashville, Tennessee 37210

Figure 1: Aerial depicting project area and 0.5 mile viewshed radius

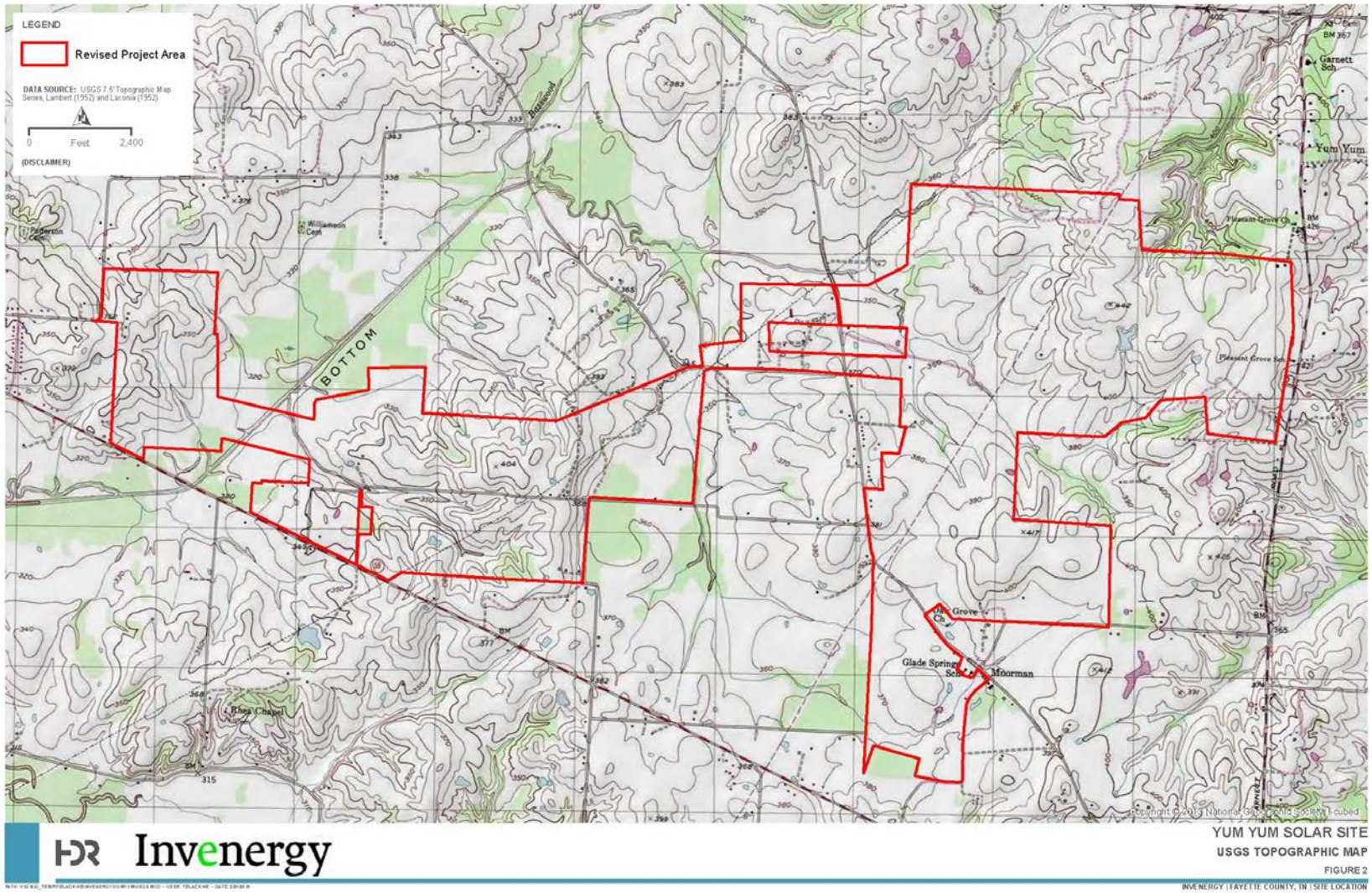


Figure 2: 7.5’ Quadrangle depicting the project area

Tennessee Valley Authority, 400 West Summit Hill Drive, Knoxville, Tennessee 37902

September 12, 2019

Mr. E. Patrick McIntyre, Jr.
Executive Director
and State Historic Preservation Officer
Tennessee Historical Commission
2941 Lebanon Road
Nashville, Tennessee 37243-0442

Dear Mr. McIntyre:

TENNESSEE VALLEY AUTHORITY (TVA) THE PROPOSED YUM YUM SOLAR ARRAY, COUNTY, FAYETTE COUNTY, TENNESSEE (35.325456 -89.401709)

TVA proposes to execute a Power Purchase Agreement (PPA) with Yum Yum Solar LLC (Yum Yum Solar), a subsidiary of Invenergy LLC, to purchase the electric power generated by a proposed solar photovoltaic (PV) facility in Fayette County, Tennessee. The proposed Yum Yum Solar Energy Center would be constructed and operated by Yum Yum Solar and would have alternating current (AC) generating capacity of 147 megawatts (MW). In addition to entering into a PPA with Yum Yum Solar, TVA would construct the proposed Yum Yum 161-kV Switching Station, and a short 161-kV transmission line (TL) would connect the new switching station to TVA's adjacent existing Cordova-South Jackson 161-kV TL. As part of the undertaking, a portion of adjacent Cordova-South Jackson TL will be upgraded.

TVA, in consultation with your office, determined the area of potential effects (APE) to be the footprint where ground disturbance could occur (approximately 2,658 acres) as a result of the proposed project and areas within a 0.5-mile radius surrounding the project footprint that would be within the PV facility's viewshed. The project area encompasses the location where solar panels may be placed and an additional 8.12-acre, 100-foot wide transmission line corridor.

Yum Yum Solar contracted with HDR to conduct a Phase I Cultural Resources Survey of the APE. Please find the resulting report titled, *Intensive Cultural Resources Survey of the Yum Yum Solar Project* enclosed.

The archaeological survey resulted in the identification of 37 archaeological sites and 39 isolated finds. Of the 37 sites, 24 sites (40FY496, 40FY497, 40FY498, 40FY499, 40FY500, 40FY502, 40FY504, 40FY505, 40FY507, 40FY507, 40FY508, 40FY509, 40FY512, 40FY513, 40FY516, 40FY517, 40FY518, 40FY519, 40FY520, 40FY521, 40FY523, 40FY524, 40FY526, 40FY530) consist of historic artifact scatters unassociated with any extant structures. TVA determines that all of these historic artifact scatters are ineligible for inclusion in the National Register of Historic Places (NRHP) based on a lack of research potential.

The remaining sites consist of the following:

- Site 40FY501 is associated with a domestic farmstead and two extant historic age structures (HS-45). TVA determined 40FY501 ineligible for NRHP listing based on limited research value.
- Site 40FY506 is a multi-component site consisting of a low density prehistoric lithic scatter and a high density historic domestic artifact scatter. TVA determined 40FY506 ineligible for NRHP listing based on lack of integrity and limited research value.
- Site 40FY511 is a rural domestic house site that dates to 1930s–1990s. TVA determined 40FY511 ineligible for NRHP listing based on lack of integrity and limited research value (Please note there is a typo in this section that states that the site dates from 1830-1890 – this is a typo and will be changed in the final report).
- Sites 40FY510, 40FY514, 40FY515, 40FY527, and 40FY529 are multi-component sites, each of which consists of a prehistoric artifact scatter and a historic rural domestic house site. TVA determined these sites ineligible for NRHP listing based on lack of integrity and limited research value.
- Site 40FY522 is a rural domestic house site associated with and extant building (HS-88) that most likely dates to 1910–1930. TVA determined 40FY522 ineligible for NRHP listing based on limited research value.
- Site 40FY528 is historic archaeological site associated with an extant rural domestic house (HS-92) that most likely dates to 1910–1940. TVA determined 40FY528 ineligible for NRHP listing based on limited research value.
- Site 40FY531 is a rural domestic house site that most likely dates to 1840–1980 associated with an extant house (HS-90). TVA determined 40FY531 ineligible for NRHP listing based on lack of integrity and limited research value.
- Site 40FY532 is a rural domestic house site associated with an extant house (HS-28). TVA determined 40FY532 ineligible for NRHP listing based on lack of integrity and limited research value.
- Site 40FY533 is a historic artifact scatter likely associated with HS-29, the former Glade Springs School Building that is located just outside the project area. Although the artifact scatter is dense (n=207), none all of the artifacts were identified below in the plow zone. TVA determined 40FY533 ineligible for NRHP listing based on lack of integrity and limited research value.

Based on the recommendations in the report, TVA has determined that each of the above 13 sites is ineligible for inclusion in the NRHP based on their limited research value and, in most of them, a lack of integrity.

During the architectural resources survey, HDR recorded 91 historic-age residential, agricultural, educational, and religious properties within both the project area and 0.5 mile radius. Five newly-recorded historic structures (HS-45, HS-88, HS-92, HS-90, HS-28) are located in the project area. TVA finds these structures ineligible for listing in the NRHP based on lack of integrity, inability to associate the structures with important event(s) or person(s), and lack of distinct workmanship and research value. The remaining 86 structures are located

outside the project area but within the 0.5 mile radius of the project area. One residence HS-34 could not be assessed during the survey but would not be visible to the project area due to vegetative screening and topography. Of the 85 remaining resources, one church (HS-27 Oak Grove Church) is located within the 0.5 mile radius. HDR recommends HS-27 eligible under Criteria C. It is TVA's opinion that this religious property does not derive its primary significance from architectural or artistic distinction or historical importance and therefore, disagrees with HDR's recommendation. Regardless of eligibility, views to the solar array from this property would be blocked by topography and vegetation. Four structures are associated with the Oak Grove Gin property including the circa 1964 Oak Grove Gin itself and warehouse (HS-31), associated circa 1910 dwelling (HS-32), a circa 1948 sharecropper's residence (HS-61), and a former store/office building (HS-33). HDR recommends the complex itself ineligible for the NRHP listing, but HS-32 eligible as an individual resource under Criterion C. TVA agrees with this recommendation. The proposed project area is 0.35 miles away from HS-32 and the viewshed would not be affected by the undertaking due to topography, modern infrastructure, and vegetative screening. HS-25 consists of a corrugated commercial building. TVA determined that HS-25 is ineligible for listing in the NRHP due to an inability to associate the property with any important event(s) or individuals(s) and a lack of architectural distinction.

In addition, four farmsteads, two schools, and five cemeteries were identified within the APE:

- Fowler Farmstead (HS-8, HS-9, HS-10, HS-11, and HS-12) consists of residential and agricultural structures located on two parcels. HS-9 consists of circa 1900 residence with four associated outbuildings. HS-10 is a single residence constructed in 1974. HS-11 is a wood-frame, side-gabled tenet house, built circa 1940. HS-12 consists of seven agricultural buildings associated with the farmstead ranging from the 1920s to the 1970s. HDR recommends the residential core HS-9. The remaining structures no longer retain integrity or are not associated with the period of significance. The boundaries of the core property, HS-9, are approximately 0.5 to 0.6 miles away from the proposed solar arrays. Rolling topography and an existing vegetative screen minimizes the viewshed effect from the project. TVA finds that the proposed undertaking would not have an effect on the eligibility of HS-9.
- Harvey Hill Farmstead (HS-7) consists a 1917 residence and associated outbuildings. TVA determined that HS-7 is ineligible for listing in the NRHP due to an inability to associate the property with any important event(s) or individuals(s) and a lack of architectural distinction.
- William W. Wilson Farmstead (HS-35) consists of a circa 1950 residence and two outbuildings. TVA finds HS-35 ineligible for listing in the NRHP due to an inability to associate the property with any important event(s) or individuals(s) and lack of architectural distinction.
- Chestnut Hill Farmstead (HS-37) consist of two residences (one historic age and one non-historic) 7 associated outbuildings. The first residence was constructed between 1828 and 1830 and underwent expansions in the 1930s and 1978. HS-37 was recognized as a Century Farm in 1976. TVA agrees with HDR's recommendations and finds that HS-37 is eligible for listing in the NRHP under Criteria A and C. The project

area is located approximately 0.4 miles from HS-37's boundary. With the presence of dense vegetation between the property and Highway 59, as well as that along both sides of Highway 59, visual effects to the property would be minimal to nonsexist. TVA finds that the proposed undertaking would not affect HS-37.

- HS-21 consists of a circa 1940 tenant house, and associated sheds and silo.
- Two historic age barns (HS-14 and HS-44) are also located within the viewshed. HS-14 is a circa 1950s barn that may have an associated residence that is far outside the 0.5 mile radius and not visible from the project area. HS-44 is a circa early nineteenth century abandoned, derelict barn. TVA determined that neither barn is eligible for the NRHP.
- Pleasant Grove School (HS-1) is a circa early 1920s African American, Rosenwald School. TVA determines that HS-1 is eligible under Criterion A in the area of Education. As a Rosenwald School, the building was constructed to serve African-American children in the Jim Crow era, made possible through a cooperative effort between the Rosenwald Fund and the local African-American community. HS-1 is located within approximately 296 feet of the project area. There is a thin vegetative buffer between the proposed solar array and the structure minimizing some of the effects to the viewshed. The project area will be partially visible from the west elevation of the building looking to the southwest. The proposed undertaking would not affect the location, materials, feeling, and association of the HS-1, the aspects of integrity most relevant to Criterion A. The proposed undertaking would have an effect the structure's integrity of its rural setting, but that effect is minimized by the presence of a vegetative buffer. In order to further minimize visual effects to HS-1, Yum Yum solar will plant additional vegetation (mixture and density of trees, shrubs, and bushes that maximize screening) around west elevation within the project.
- Glade Springs School (HS-29) is a circa 1900 one-story school for white rural school children. The Oak Grove United Methodist Church purchased the building in 1931 and used it as a Sunday School until 1962-1963 when it was abandoned. The historic structure itself is located directly outside the project area within the viewshed. The historic structure is associated with archaeological site 40FY533 within the project area. The structure has been abandoned and is in a state of disrepair. TVA finds that the structure no longer retains integrity and is ineligible for listing in the NRHP due to the inability to associate the property with important event(s) and individuals(s) and lack of architectural distinction.
- Pleasant Grove Church Cemetery (HS-3) is an African-American cemetery dating to 1932. The church cemetery is not found to have an association with historic events or persons (Criteria A and B) and the funerary architecture present is not found to have significance under Criterion C. Therefore, TVA determines HS-3 ineligible for the NRHP.
- Patterson Cemetery (HS-87) was inaccessible and therefore unassessed. However, TVA was able to ascertain that this structure is not within the undertaking's viewshed.
- Watkins Cemetery (HS-89) contains an obelisk and two burials with headstones and footstones. The cemetery appears to have been out of active use since the 19th century. Dense vegetation surrounds the grave markers, and cleared fields surround the small wooded area around the graves. The cemetery is not found to have an

association with historic events or persons (Criteria A and B) and the funerary architecture present is not found to have significance under Criterion C. Therefore, TVA finds HS-3 ineligible for the NRHP. The cemetery is located within the project area. Although the cemetery is ineligible for the NRHP, the cemetery is subject to Tennessee Code Title 46. In order to ensure that no burial will be impacted by the proposed undertaking, no ground disturbing work will take place within a 20-meter buffer of the cemetery boundaries.

- Williamson Cemetery (HS-46) – is an African American cemetery with use from 1887 to 2000. TVA finds HS-46 ineligible for the NRHP due to lack of transcendent importance based on distinctive design features or association with historic events to find the property.
- Garnett Cemetery (HS-63) is associated with the town of Yum Yum. The earliest tombstones date from 1866. TVA finds HS-63 ineligible for the NRHP due to lack of transcendent importance based on distinctive design features or association with historic events to find the property.

HS-34 is a circa 1965 single family residence that was not assessed due to lack of access. However, HS-34 is not within the viewshed of the proposed project area and would not be affected. For the remaining 66 single family residences:

- Seven resources (HS-17, HS-18, HS-19, HS-20, HS-22, HS-23, HS-24) were constructed circa early 1970's and part of the Williams Subdivision.
- Sixteen resources (HS-66, HS-67, HS-68, HS-69, HS-70, HS-71, HS-72, HS-73, HS-74, HS-75, HS-76, HS-77, HS-78, HS-79, HS-80, HS-81) were also constructed circa early 1970s and part of the Woods Subdivision.
- Five resources (HS-26, HS-27, HS-28, HS-30, HS-90) are associated Community of Moorman/Oak Grove with construction dates ranging from circa 1830s to mid-1970s;
- Three resources (HS-4, HS-5, HS-6) are associated with the Community of Yum Yum ranging from the 1880s to the 1960s.
- Five resources (HS-82-HS-86) are circa 1970s ranch style homes located along Wagon Wheel Drive.
- Seventeen resources (HS-13, HS, 26, HS-36, HS-38, HS-39, HS-40, HS-42, HS-49, HS-51, HS-52, HS-54, HS-58, HS-59, HS-60, HS-62, HS-65, HS-67) are circa 1960s to early 1970s ranch homes.
- Three (HS-15, HS-16 and HS-41) are circa 1930s plain traditional style residences
- Ten (HS-43, HS-47, HS-48, HS-50, HS-53, HS-54, HS-65, HS-55, HS-56, HS-57) are circa 1950s -1960s minimal traditional or transitional ranch style homes.

TVA determined that these 66 structures are ineligible for listing in the NRHP due to an inability to associate them with important event(s) or individuals(s) and a lack of architectural distinction.

Pursuant to 36 CFR Part 800.3(f)(2), TVA is consulting with federally recognized Indian tribes regarding properties within the survey area that may be of religious and cultural significance to them and eligible for the NRHP.

Pursuant to 36 CFR Part 800.5(c) we are notifying you of TVA's finding of no adverse effect, providing the documentation specified in § 800.11(e); and inviting you to review the finding. Also, we are seeking your agreement with TVA's eligibility determinations and finding that the undertaking as currently planned will have no adverse effects on historic properties.

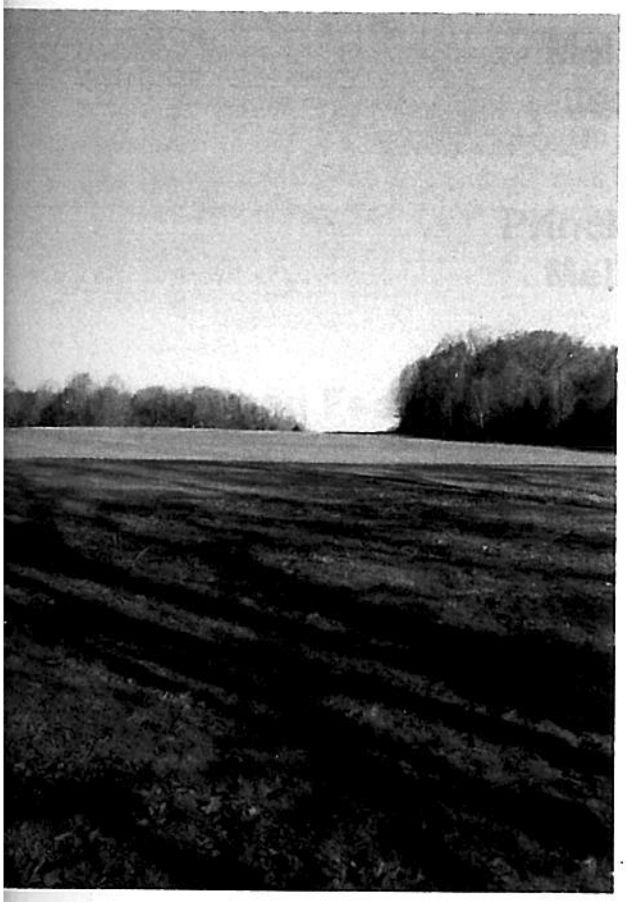
Please contact Michaelyn Harle by phone, (865) 632-2248 or by email, mharle@tva.gov, with your questions.

Sincerely,

Edward W. Wells

Edward W. Wells on Behalf of Clinton E. Jones
Manager
Cultural Compliance

MSH:ABM
Enclosures
cc (Enclosures):
Ms. Jennifer Barnett
Tennessee Division of Archaeology
1216 Foster Avenue, Cole Bldg. #3
Nashville, Tennessee 37210



DRAFT

Intensive Cultural Resources Survey of the Yum Yum Solar Project

Fayette County, Tennessee

August 2019

By: Melanie Johnson and Jessica Forbes
Principal Investigator: Melanie Johnson

Lead Federal Agency: Tennessee Valley Authority

TENNESSEE HISTORICAL COMMISSION
STATE HISTORIC PRESERVATION OFFICE
2941 LEBANON PIKE
NASHVILLE, TENNESSEE 37243-0442
OFFICE: (615) 532-1550
www.tnhistoricalcommission.org

September 24, 2019

Mr. Clinton E. Jones
Tennessee Valley Authority
Biological and Cultural Compliance
400 West Summit Hill Drive
Knoxville, TN 37902

RE: TVA / Tennessee Valley Authority, Proposed Yum Yum Solar Array (35.32546, -89.401709), Fayette County, TN

Dear Mr. Jones:

Pursuant to your request, this office has reviewed documentation concerning the above-referenced undertaking. Our review of and comment on your proposed undertaking are among the requirements of Section 106 of the National Historic Preservation Act. This Act requires federal agencies or applicants for federal assistance to consult with the appropriate State Historic Preservation Office before they carry out their proposed undertakings. The Advisory Council on Historic Preservation has codified procedures for carrying out Section 106 review in 36 CFR 800 (Federal Register, December 12, 2000, 77698-77739).

Based on the information provided, we concur with your agency's that the archaeological sites 40FY496, 40FY497, 40FY498, 40FY499, 40FY500, 40FY501, 40FY502, 40FY503, 40FY504, 40FY505, 40FY506, 40FY507, 40FY508, 40FY509, 40FY510, 40FY511, 40FY512, 40FY513, 40FY514, 40FY515, 40FY516, 40FY517, 40FY518, 40FY519, 40FY520, 40FY521, 40FY522, 40FY523, 40FY524, 40FY525, 40FY526, 40FY527, 40FY528, 40FY529, 40FY530, 40FY531, 40FY532, 40FY532, and 40FY533 are not eligible for inclusion in the National Register of Historic Places. We further concur that the Pleasant Grove School and Outbuilding #2 at Chestnut Hill are eligible for listing in the National Register of Historic Places. We further concur that the project as currently proposed will not adversely affect these historic properties.

This office has no objection to the implementation of this project as currently planned. If project plans are changed or previously unevaluated archaeological resources are discovered during project construction, please contact this office to determine what further action, if any, will be necessary to comply with Section 106 of the National Historic Preservation Act. Questions and comments may be directed to Jennifer M. Barnett (615) 687-4780. We appreciate your cooperation.

Sincerely,

E. Patrick McIntyre, Jr.

E. Patrick McIntyre, Jr.
Executive Director and
State Historic Preservation Officer

EPM/jmb

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Office of the Chief

Chuck Hoskin Jr.
Principal Chief

Bryan Warner
Deputy Principal Chief

October 15, 2019

Marianne Shuler
Tennessee Valley Authority
400 West Summit Hill Drive
Knoxville, TN 37902

Re: Proposed Yum Yum Solar Array

Ms. Marianne Shuler:

The Cherokee Nation (Nation) is in receipt of your correspondence about **Proposed Yum Yum Solar Array**, and appreciates the opportunity to provide comment upon this project.

The Nation maintains databases and records of cultural, historic, and pre-historic resources in this area. Our Historic Preservation Office reviewed this project, cross referenced the project's legal description against our information, and found no instances where this project intersects or adjoins such resources. Thus, the Nation does not foresee this project imparting impacts to Cherokee cultural resources at this time.

However, the Nation requests that the Tennessee Valley Authority (TVA) halt all project activities immediately and re-contact our Offices for further consultation if items of cultural significance are discovered during the course of this project.

Additionally, the Nation requests that TVA conduct appropriate inquiries with other pertinent Tribal and Historic Preservation Offices regarding historic and prehistoric resources not included in the Nation's databases or records.

If you require additional information or have any questions, please contact me at your convenience. Thank you for your time and attention to this matter.

Wado,

Elizabeth Toombs, Tribal Historic Preservation Officer
Cherokee Nation Tribal Historic Preservation Office
elizabeth-toombs@cherokee.org
918.453.5389

October 24, 2019

Ms. Marianne Shuler, Senior Specialist,
Archaeologist and Tribal Liaison
Cultural Compliance
Tennessee Valley Authority
400 West Summit Hill Drive
460 WT 7D-K
Knoxville, TN 37902

Dear Ms. Shuler:

Thank you for the letter of notification for the proposed Power Purchase Agreement with Yum Yum Solar, a subsidiary of Solar Project Development LLC, to purchase power from a proposed solar facility in Fayette County, Tennessee. We accept the invitation to consult under Section 106 of the National Historic Preservation Act.

The Chickasaw Nation supports the proposed undertaking and is presently unaware of any specific historic properties, including those of traditional religious and cultural significance, in the project area. In the event the agency becomes aware of the need to enforce other statutes we request to be notified under ARPA, AIRFA, NEPA, NAGPRA, NHPA and Professional Standards.

Your efforts to preserve and protect significant historic properties are appreciated. If you have any questions, please contact Ms. Karen Brunso, tribal historic preservation officer, at (580) 272-1106, or at karen.brunso@chickasaw.net.

Sincerely,

Lisa John, Secretary
Department of Culture and Humanities

cc: mmshuler@tva.gov

Appendix G

TVA Class Review of Repetitive Actions in the 100-Year Floodplain

1981 TVA Class Review of Repetitive Actions in the 100-Year Floodplain

22845-22846 Federal Register / Vol. 46, No. 76 / Tuesday, April 21, 1981 / Notices

TENNESSEE VALLEY AUTHORITY

Class Review of Repetitive Actions in 100-Year Floodplain

AGENCY: Tennessee Valley Authority.

ACTION: Second public notice for a class review of repetitive actions in the 100-year floodplain.

TVA's Floodplain Management and Protection of Wetlands procedures, 44 FR 45513-24 (1979), implementing Executive Order Nos. 11988 (Floodplain Management) and 11990 (Protection of Wetlands), require TVA to evaluate potential impacts on and consider alternatives to siting in the 100-year floodplain (or a larger floodplain for critical actions) or permitting or taking actions in a wetland in connection with the issuance of licenses, permits, and approvals for land-use activities, and in connection with the acquisition, management, and disposition of TVA facilities and Federal lands under TVA control. Item No. 12 of those procedures permits TVA to evaluate, as a class, routine or recurring actions when the considerations of whether to locate in a floodplain are substantially similar. TVA will continue to individually review proposals to permit or take actions within a wetland due to the individual characteristics of wetlands.

There are certain recurring activities usually occurring adjacent to streams or TVA reservoirs that TVA has evaluated as a class to determine their impacts on natural and beneficial floodplain values. These activities are conducted at times by TVA or other governmental entities but principally by members of the public. In the latter two cases, TVA is involved due to the need to obtain TVA approval pursuant to Section 26a of the Tennessee Valley Authority Act of 1933, as amended, 16 U.S.C. 83ly-1, the need to obtain a license or property interest from TVA, or because of a cooperative agreement to which TVA is a party. The following actions were evaluated to determine their impacts on natural and beneficial floodplain values:

1. Private and public water use facilities [e.g., fixed or floating boat docks, fixed or floating boathouses, floats, fixed piers, rafts, floating ski jumps and slalom courses, and buoy lines for swimming areas);

2. Commercial recreation boat dock and water use facilities [e.g., docks, fixed piers, floats, fixed or floating boat slips, fixed or water-related dock buildings but not including habitable structures: fuel handling facilities, floodproof buildings for dry boat storage, and minor dredging for boat channels and harbors);

3. Picnic tables, benches, grills, and fences on TVA lands;

4. Underground, overhead, or anchored utility and related lines and support structures [e.g., cable TV, electric, pipeline, sewer, telephone, and water);

5. Water intake structures;

6. Outfalls;

7. Mooring and loading facilities for barge terminals;

8. Agricultural use of TVA land;

9. Minor grading and fills (e.g., slopes for boat launching ramps, public highways, railroad crossings, pedestrian walkways and crossings, private driveways, retaining walls and riprap for bank stabilization, and parking lots);

10. Bridges and culverts for pedestrian, highway, and railroad crossings; and

11. Small private land-based storage sheds and buildings having less than 25 square feet of floor space and used for storage of water use related equipment.

Preliminary notice of this proposal was published January 15, 1981, in the Federal Register, and resulted in no public comments. TVA has determined that there is normally for each of these actions no practicable alternative, consistent with TVA's policy, to siting in the floodplain, and through application of routine criteria, the adverse impact of these actions on natural and beneficial floodplain values is minimized. These criteria are:

1. All facilities should be designed and constructed to withstand flooding with minimum damage.

2. All activities will adhere to the minimum standards of the National Flood Insurance Program published at 44 CFR 60.1-60.8 (1980), and any future amendments thereto, and comply with local floodplain management regulations. In accordance with these minimum standards, proposed actions will be evaluated to ensure that development (1) will not significantly increase 100-year flood elevations; and (2) will not involve placement of fill or other flow obstructions in the floodway portion of the floodplain unless compensatory adjustments are also included.

3. To the extent practicable, construction and maintenance will be scheduled during dry periods.

4. Existing vegetation (ground cover and canopy) will be left in place and undisturbed to the maximum extent practicable.

5. "Best Management Practices" will be used as a minimum to control surface water runoff and erosion. These practices are described in Guidelines For Erosion and Sediment Control Planning and Implementation (EPA Environmental Protection Technology Series Report No. EPS-R2-72-015, August 1972). Disturbed areas will be reseeded as soon as possible with species adapted to existing conditions.

6. Dredge spoil will be disposed of properly in accordance with local, State, and Federal regulations at an inland site outside identified floodways.

7. Riprap, as opposed to soil, will be utilized as fill material below the maximum normal pool elevation.

8. Prior to crossing areas harboring threatened or endangered species, or areas specifically identified as “sensitive,” biologists will be contacted and will assist in the determination of mitigative measures necessary to negate or minimize impacts to these areas.

9. In areas where overhead structures are constructed, streambanks will not be disturbed and equipment will not be driven in streams; selective cutting will be used to remove intruding vegetation; stumps will be left at a height which will encourage resprouting, retain soil, and reduce overland waterflow; and no areas will be stripped of vegetation.

Normally, when such criteria are met, the floodplain would not be irreparably damaged by construction activities, altered significantly in volume and rate of flow, or significantly reduced in flood storage capacity.

Appropriate conditions and terms to require all practical measures to minimize harm on the floodplain will be included in the authorizations and approvals issued by TVA. TVA will also take these measures if it maintains or constructs any of these facilities.

This review will in no way constitute or evidence approval by TVA, where TVA property rights are involved, or within the meaning of Section 26a of the TVA Act, of any structure or facility falling within the class. Persons wishing to undertake the activities listed here or other activities requiring TVA approval are cautioned that they must apply for TVA approval in the same manner as they are currently required to do.

Any comments on this review by TVA should be submitted to: John R. Paulk, Director, Division of Land and Forest Resources, Tennessee Valley Authority, Norris, Tennessee 37828, no later than May 21, 1981. Comments may also be telephoned to TVA’s Citizen Action Line at 1-800-362-9250 (inside Tennessee), 1-800-251-9242 (outside Tennessee), and 632-4100 in Knoxville or by contacting TVA’s Information Office, 400 Commerce Avenue, Knoxville, Tennessee 37902.

Dated: April 14, 1981.

Lawrence L. Calvert,

Assistant Director, Division of Land and Forest Resources.

[FR Doc. 81-11941 Filed 4-20-81; 8:45 am]

BILLING CODE 8020-01-M

Appendix H

Public Comments and Responses

Topic	Comment	Commenter(s)	Response
Alternatives	Information provided in the EA suggests that no alternative project site locations were considered. For example, Section 2.3, Alternatives Eliminated from Further Consideration, states only that the Project sought rural, open land near transmission facilities with appropriate zoning and does not provide more specific information on alternative locations considered. The Draft EA also does not consider an alternative to impacting the Project Area in Fayette County and benefiting a consumer in Montgomery County, geographically removed from the Project Site. Alternative locations, such as TVA transmission line rights-of-way; at-capacity landfills; parking lots with solar panel heights that would allow vehicles to park underneath; and rooftops, such as those of government buildings, arenas, colleges and other schools, and large warehouses and factories, should be considered instead of locations currently supporting productive agricultural activities. Installation of panels on multiple, distributed sites with energy outputs that would together equal the megawatt output of the Project would be another alternative to consider. Specifically suggested alternative sites include other portions of Fayette County, outside of Fayette County, areas closer to Clarksville in Montgomery County, TN, and the rooftop of the Google plant that would receive power from the Project.	Ben Bruce; Debbie Bruce; Gary Bullwinkel; Debby Butler; Katrina Greer; Sheila Jones; Patricia Marshall; JoAnn McIntosh	Section 2.3 of the Draft EA describes the site screening process that led to selection of the Project Site for development of the Project. A reasonable range of alternatives were considered for the Project, as defined in the Council on Environmental Quality regulations for implementing the National Environmental Policy Act at 40 CFR § 1502.2(e). The reasonable range of alternatives for a given proposed action shall encompass those to be considered by the ultimate agency decision-maker. The purpose and need of the Project is to provide cost-effective renewable energy consistent with the Integrated Resource Plan and TVA goals. The Draft EA evaluates whether or not to purchase the power generated by the Project under the conditional 20-year power purchase agreement with Yum Yum Solar. Thus, the reasonable range of alternatives for the Proposed Action was determined to be the No Action Alternative and the Proposed Action Alternative.
Alternatives	TVA should consider using natural gas from the gas transmission lines near the Project Site to operate generators and, thus, produce electricity in an alternate manner from the Project. This approach would have a footprint one-one hundredth the size of the 4,003-acre Project location.	Karl Peterson	Section 1.1 of the Draft EA describes the request for proposal to which Yum Yum Solar responded that led to the Project. The RFP was issued in 2017 to help TVA meet immediate needs for additional renewable generating capacity in response to customer demands and fulfill the renewable energy goals established in the 2015 IRP. Producing electricity via the gas transmission line near the Project Site would not help fulfill TVA's need for additional renewable generating capacity or the intent of the RFP.

Topic	Comment	Commenter(s)	Response
Best Management Practices	When deciding how wood wastes generated from the Proposed Action will be disposed, the Project should consider chipping, composting, or grinding of the waste rather than open burning, if possible. If open burning is selected, TVA should consider implementing a smoke management plan, banning burning on air quality alert days, and coordinating burning with other agencies, including local and state air pollution control agencies, forestry agencies, and local fire departments.	Matt Taylor, TDEC	Section 1.4 of the Draft EA states that vegetative waste from clearing activities would be burned or chipped and ground. If open burning is selected, the appropriate open burning permits would be obtained from the Tennessee Division of Forestry, and information on open or surface burning issued by TDEC would be followed. Weather conditions would be monitored and considered to ensure safety and minimal degradation to air quality during the open burning of any vegetation cleared from the site. Section 2.2 of the Final EA has been modified to indicate the preference of Yum Yum Solar is for chipping and grinding; however, the contractor may select burning.
Biological Resources	The proposed solar facility may cause "mortal risks to wildlife," which may demand additional consideration and management. The Project may cause substantial habitat loss. Avian species may be particularly prone to impacts from the Project due to the "lake effect" caused by the solar panels and via heat reflected by the panels. Terrestrial wildlife may be substantially limited by the 6 to 10 miles of fencing that would surround the Project Site. The Project may cause particular issues to bird and terrestrial wildlife if it is sited in breeding areas or migratory corridors for such wildlife.	Ben Bruce; Debbie Bruce; Debby Butler; William Hendry; Karl Peterson	Section 2.2 of the Draft EA describes that Project fencing would surround module and inverter blocks in close vicinity and not separated by public roads. The entire perimeter of the Project Site would not be fenced. Habitat assessments conducted by HDR staff and described in Section 3.4 of the Draft EA determined that the forested areas of the Project Site offer habitat for terrestrial species. However, the majority of the site is under active agricultural production or is grazed, and overall species diversity is low. Project impacts to forested land would be minimal due to most forested areas on the Project Site being outside of the area proposed for development and the impacted portions being ruderal forest, which generally occurs in narrow strips or small patches among agricultural fields on the Project Site. Wildlife would be able to utilize corridors for movement through the Project Site. Yum Yum Solar does not anticipate that avian species would be more affected by the Project than other wildlife species. Most reports of avian mortality at solar farms are from concentrated solar facilities. Concentrated solar facilities use mirrors to concentrate and reflect solar energy onto a receiver; this is a different technology than is being proposed for the Project. Research on photovoltaic solar panels similar to those proposed for the Project shows that heating is minimal. Additionally, based on the current publicly available avian data for operational solar facilities, there is no empirical evidence that supports the “lake effect” from solar panels; therefore, increased mortality of avian species is not anticipated in relation to the Project.

Appendix H: Public Comments and Responses

Topic	Comment	Commenter(s)	Response
Comparison of Alternatives	Section 2.4, Comparision of Alternatives, does not provide statements on the effects of the No Project Alternative.	Gary Bullwinkel	Table 2-1 in Section 2.4 of the Draft EA has been revised in the Final EA to reflect the findings of the No Action Alternative impact analysis found in Section 3 of the Draft EA.
Cultural Resources	The Draft EA does not inventory a known historical home that is located within the area of potential effects to cultural resources.	Katrina Greer	The HDR cultural resources team determined that this historical resource is located within the Project's area of potential effects (APE) for cultural resources. However, the resource is in a location that does not have a view of the Project due to terrain, vegetation, and/or modern built environments. Thus, the team concluded that this resource is outside of the Project Viewshed, as described in Section 3.8 of the Draft EA.
Cumulative Impacts	Section 4.4, Cumulative Effects, only considers cumulative impacts from Federal and local projects and not the potential for cumulative impacts from additional solar facilities further displacing agricultural activities in Fayette County.	Gary Bullwinkel	Two additional utility-scale solar sites are known to exist in Fayette County, the 2.7-megawatt Somerville Solar facility sited on closed sections of the Fayette County landfill in Somerville and the 20-MW Wildberry Solar Center in Moscow. The power generated from these facilities is being sold to TVA under 20-year power purchase agreements. While TVA anticipates the expansion of solar output over the next 20 years that is predicated on changing market conditions and future demand, as per TVA's 2019 Integrated Resources Plan, there are no existing TVA plans for siting additional solar facilities in Fayette County. The analysis of cumulative effects in Section 4.4 of the Draft EA has been expanded in the Final EA to include existing or other proposed utility-scale solar facilities in Fayette County.

Topic	Comment	Commenter(s)	Response
Decommissioning and Reclamation	In Section 4.3 of the Draft EA, TVA repeats its assertion that, "because removal of the solar arrays and associated on-site infrastructure could be accomplished rather easily," resources are not being lost. However, the Draft EA lacks discussion on the bond to guarantee proper and environmentally friendly decommissioning of the solar facility and, relatedly, does not present how the pilings, panels, underground cables, and roadways would be removed. The Draft EA does not inform readers who would issue the bond, the legal language of the bond, whether the bond would transfer to a new owner if the facility were sold to another entity, and whether the bond would be insured by a "financially strong third party" that would remain in business at the point of decommissioning the solar facility in 20 years.	Gary Bullwinkel; Ben Bruce; Debbie Bruce; Karl Peterson	Section 2.2.4 of the Draft EA describes the decommissioning and reclamation of the solar facility. Once operations cease and the facility is removed, the Project Site would be restored per Project decommissioning requirements. The facility would not irreversibly alter the Project Site, which could be used for other productive purposes once the Project is decommissioned. Yum Yum Solar is currently developing the decommissioning plan for the Project. The plan will include detailed commitments regarding decommissioning of the solar panels and racking, tracking system, foundations and steel piles, transformers and inverters, electrical cabling and conduits, perimeter fencing, and access roads. The plan will also include details on the decommissioning bond that will guarantee the commitments are accomplished. The decommissioning plan for the Project will be finalized upon review by Fayette County later in the county review process. The facility would not irreversibly alter the Project Site, which could be used for other productive purposes once the Project is decommissioned. Section 2.2.4 of the Final EA has been modified to reflect that the decommissioning plan is being developed in coordination with Fayette County.
Environmental Justice	The Project Site is adjacent to a large rural minority neighborhood that is addressed in the Draft EA using a census tract analysis but not by directly acknowledging this community and the potential for loss of agricultural jobs among this community. Local people have been concerned about why adequate direct notice was not given to this community.	Gary Bullwinkel	In July 2019, the Fayette County Planning Director sent out letters to all residents within 500 feet of the Project Site to provide notice of upcoming public hearings on the Project. Section 3.14 of the Draft EA provides environmental justice analysis commensurate with expected Project impacts. The Draft EA recognizes that minority and low-income populations are present in the Project Area at higher rates than the county and state. It is further recognized that the Project Site has an estimated poverty rate that is higher than the official U.S. poverty rate of 12.3 percent. However, overall, the impacts of the proposed Yum Yum Solar Energy Center would primarily occur during the 20-month construction period and would be minor, and Project Area impacts would be negligible. Therefore, in-depth analysis regarding the specific impacts to the minority or low-income population was not warranted in the Draft EA. Section 3.13 has been revised in the Final EA to reflect employment findings of the economic impact analysis conducted for the Project, and these additional data are referenced in Section 3.14 of the Final EA.

Topic	Comment	Commenter(s)	Response
General	Incomplete statement as follows: “I live next to a 350 acre field that will be taken in by the yum yum solar project. Needless to say I am very concerned about the impact this will have on my property …”	Joseph Tapp	TVA responded to this comment to request a complete comment. However, a complete comment was not received during the public comment period.
General	Question of to whom to direct comments on the project	Katrina Greer	TVA responded to this to request by supplying contact details for the appropriate TVA NEPA specialist, and a full comment was received during the public comment period. The comment is addressed in other portions of this comment matrix.
General	The Project represents "positive development" and would help bring us closer to 100% renewable energy. The Project would be a "positive impact on our area and the environment" and could be a "model for the blending of agriculture and energy production."	Sam Dornan; William Garnett	Section 1.1 of the Draft EA discusses TVA’s objectives to deliver reliable, low-cost, and cleaner energy while reducing environmental impacts. Cost-effective renewable energy, including energy generated by solar photovoltaic systems like the proposed Yum Yum Solar Energy Center, is one of the energy resources recommended in the Integrated Resource Plan. The Project would represent a substantial contribution to this end.
General	A company that does erosion, sod, and seeding work in the Memphis area requests the opportunity to work on the Project.	Michael Owen	Yum Yum Solar encourages your company to submit proposals for work to be contracted; please look for Project contract bids to be advertised locally.
General	The Draft EA does not discuss TVA's role in the development of the Fayette County special exception code during the preliminary preparations of the Project or TVA's role as a 'monopolistic supplier of energy' and its role in changing land usages to solar uses where TVA transmission lines exist across Tennessee.	Gary Bullwinkel	The TVA Act authorizes TVA to provide grid-delivered electricity within the TVA service area and to utilize local power companies to deliver that electricity to end users. The grid-delivered electricity may be either generated by TVA facilities or purchased by TVA from facilities owned by other power producers. The Proposed Action aligns with these authorities. The Proposed Action does not affect TVA’s management of transmission line right-of-ways.
General	TVA's "restrictive solar policy in its relations to the electric cooperatives of Tennessee" does not allow for the creation of "community solar systems" by the cooperatives, which could generate solar energy in distributed and multiple locations in TVA's service area.	Gary Bullwinkel	TVA has supported the development of community solar systems by local power companies, and by August 2018, eight such systems were operating in the TVA service area, including systems near Chattanooga, Nashville, Memphis, Shelbyville, and New Market. TVA continues to support community solar systems in partnership with Local Power Companies through its recently established Flexibility Research Project pilot program.

Topic	Comment	Commenter(s)	Response
General	The Draft EA lacks in-depth studies, assessments, and analysis, especially in relation to reasonable alternatives, socioeconomic effects to minorities and other local populations, and cumulative effects, and instead makes "assumptive conclusions" and reports only minor and indirect effects on the human environment. However, the Project would have degrading effects on productive farmland and negative effects on local waters. These factors, combined with the large size of the Project, shows that an environmental impact statement (EIS) should be developed for the Project. The proposed EIS would have an expanded geographic scope, a reasoned treatment of the cumulative effects of the loss of farmland, and a study of reasonable alternatives regarding the facility siting and methods of generating renewable energy.	Gary Bullwinkel	The EA incorporates TVA's 2015 Integrated Resource Plan (IRP) Environmental Impact Statement (EIS) and 2019 IRP EIS by reference. These EISs address alternative methods of generating both renewable and non-renewable energy and provide a high-level description of the environmental impacts of each generation method. The purpose and need of the Project is to provide provide cost-effective renewable energy consistent with the IRPs and TVA goals. The Draft EA evaluates whether or not to purchase the power generated by the Project under the conditional 20-year power purchase agreement with Yum Yum Solar. The finalization of this PPA would result in TVA acquiring the electricity generated by the facility, fulfilling a portion of the increase in solar generating capacity incorporated in both the 2015 and 2019 IRPs. The Draft EA provides detailed descriptions of the resources that could be affected by the Proposed Action and of the potential impacts, both adverse and beneficial, to those resources. Whether or not an EIS is required depends on whether or not the impacts of the Proposed Action are significant, as defined in the Council on Environmental Quality regulations for implementing the National Environmental Policy Act at 40 CFR § 1508.27. To date, TVA has not identified potential impacts associated with the Proposed Action that are likely to be significant.
Geology	Due to the Project being within the New Madrid Seismic Zone, it is anticipated that Fayette County would be impacted or severely impacted during a major seismic event. TDEC recommends TVA consider soil amplification and liquefaction potential at the Project Site to determine the risk from seismic activity. Additionally, TDEC recommends designing and constructing the Yum Yum Solar Energy Center such that it meets the most current earthquake readiness recommendations.	Matt Taylor, TDEC	Considering its location within the New Madrid Seismic Zone, the Project would account for seismic risk when finalizing Project design. The Project structural Engineer of Record would design the project in accordance with the locally adopted building codes and standards, including consideration of seismic ground accelerations for the New Madrid Seismic Zone, the potential for soil amplification and liquefaction, and making design adjustments to account for these data.

Topic	Comment	Commenter(s)	Response
Land Use	The Draft EA does not address the use of the Fayette County zoning code "special exception," which allows the Board of Zoning Appeals to give a permit for 4,003 acres of industrial development in an area zoned Rural Residential and protected by Tennessee's Public Chapter 1101 and by the limitations set by Public Chapter 1101 to allow exceptions only when the proposed land use exception is "in harmony" with existing land use. The Draft EA also does not consider the effects to land use related to employing the "special exception" zoning for renewable energy facilities. The limits on the use of a special exception as set by Public Chapter 1101 do not include "spot zoning" industrial sites into arbitrary locations in areas zoned Rural Residential areas. This practice by TVA is an "arbitrary act of a Federal agency choosing or even encouraging counties to thwart State zoning laws" to enable their actions.	Gary Bullwinkel	Section 3.1 of the Draft EA describes the land use and current zoning of the Project Site and the surrounding area, including that solar power is permitted as a special exception, per the 2017 Fayette County Zoning Resolution. This section of the Draft EA also describes the potential impacts of the Proposed Action on land use. Because the Project Site is rural with no zoning restrictions and solar power is considered to be a special exception land use type in the Project Area, the development of the Project Site as a solar facility is compatible with current land use regulations. Therefore, the Project is an allowable use of the site under its current zoning. Details on the county special exception zoning approval process have been added to Section 1.3 of the Final EA.
Land Use	The Draft EA describes the Project Site as adjacent to or within 2 miles of commercial and industrial areas. This representation obscures that the Project is proposed as an industrial use in the midst of areas dominated by agricultural uses.	Gary Bullwinkel	Section 3.1 of the Draft EA acknowledges that the Project Site is within an area where agricultural, rural-residential, and undeveloped land uses dominate for at least 2 miles in all directions, while also acknowledging that some industrial uses exist in that radius, as well.
Land Use; Prime Farmland	The Project would occupy "about 1% of the total land area in the county" in an area zoned Rural Residential and would convert a large amount of farmland that is designated "prime farmland." Thus, the Project would result in negative impacts to land that is legally preserved for agriculture. The Draft EA is unclear as to whether Project effects would allow for return to productive agricultural uses after the decommissioning and reclamation phase of the Project. For example, the Project Site could become "blighted and spoiled" due to the proposed industrial uses.	Gary Bullwinkel; Debby Butler; Diana Graves; Sheila Jones; JoAnn McIntosh; Karl Peterson	The conversion of prime farmland is not prohibited at the federal level. As described in Section 3.2 of the Draft EA, the Farmland Protection Policy Act requires that federal agencies consider the adverse effects of their actions on prime or unique farmlands and provides direction for completing Form AD-1006 in order to do this. The Project would occupy approximately 2,639 acres, and this use of about 0.6 percent of the total land area of Fayette County would not result in "blighted and spoiled" land that would disallow nonindustrial land uses, as discussed in Sections 3.1, 3.2, and 3.10 of the Draft EA. Yum Yum Solar would implement decommissioning and reclamation actions to the extent that they do not conflict with any applicable federal, state, or local rules and regulations, or other permits or approvals applicable to the Project. Areas disturbed during removal of Project components would be restored and rehabilitated as near as possible to their preconstruction condition. Reclamation would

Topic	Comment	Commenter(s)	Response
			consist of re-contouring areas, establishing vegetation, and applying mulch or cover crops to provide additional erosion control. Overall, the long term use of the Project Site as a solar facility would not permanently alter the Project Site nor restrict its use as agricultural land after the Project.
Mitigation Measures	The Draft EA noted that the "wildlife within the developed area would be controlled by a catch-and-release program," which could disrupt other ecosystems and cause wildlife death.	Ben Bruce; Debbie Bruce	The Project would not employ a catch-and-release program for wildlife. As described in Section 2.5 of the Draft EA, Project personnel would be instructed on wildlife resource protection measures, including direction to prohibit animal disturbance. If wildlife concerns arise, the Tennessee Wildlife Resource Agency would be contacted to address the issues per their standard practices and applicable state and federal laws.
Noise	The Project would cause excessive noise from pile drivers and construction vehicles for 20 months, which seems a long period of time from the perspective of a nearby resident.	Katrina Greer	Section 3.6 of the Draft EA describes the existing noise levels in the Project Area as well as noise levels expected from the Project. Noise-sensitive receptors adjacent to proposed solar arrays, the Yum Yum 161-kV Switching Station, and the proposed 190-foot transmission line (TL) connection would temporarily experience heightened noise primarily during pile driving for the array foundations and pole drilling for the new TL pole structures. These activities would occur for approximately 6 months of the 20-month construction period and would be minimized due to being limited to daylight hours and the Project being setback at least 500 feet from existing roadways, adjacent to which most noise receptors are located.

Topic	Comment	Commenter(s)	Response
Permits and Approvals	TDEC understands that a number of old buildings and abandoned structures exist in the project area but it is unclear as to whether any of the structures would be required to be demolished or removed from the site. If any demolition activity is anticipated, an Asbestos Demolition or Renovation Notification should be provided as needed in advance of any demolition work. TDEC encourages TVA to include discussion in the Final EA relating to the need to complete appropriate notification(s) in advance of any demolition activities as required under the state of Tennessee asbestos regulations and that if Regulated Asbestos-Containing Material is identified as present or likely to be encountered during the proposed project, that appropriate measures be taken to abate the asbestos as needed.	Matt Taylor, TDEC	The Project would not demolish any buildings on the Project Site. Existing buildings were avoided during the Project design process to minimize impacts to cultural and biological resources.
Permits and Approvals	Some existing and new solar power generating facilities may use emergency engines (diesel, gasoline or natural gas/propane powered) to operate emergency electric generators on site. The Draft EA does not include a reference to this type of equipment. If emergency generators are to be installed on site they may be subject to permitting under TDEC's "Permit by Rule" regulations or may be small enough to qualify as an "insignificant activity" and not be subject to permitting. TDEC encourages TVA to include discussion relating to this in the Final EA.	Matt Taylor, TDEC	Section 1.4 of the Final EA has been revised to reflect the potential for use of emergency combustion engines during emergency situations.
Permits and Approvals	The Draft EA indicates there will be a septic tank and well installed for the operational and maintenance building, which will likely require TDEC permitting. Full time staff for the building is expected to be 6 persons. If the septic system has the capacity to serve more than 20 persons, it will need to be permitted as a large capacity septic system. If the well will serve 25 or more persons more than 60 days per year, it will be considered a public water system and be regulated either as a transient non-community system or a non-transient non-community system. TDEC encourages	Matt Taylor, TDEC	Section 1.4 of the Final EA has been revised to reflect TDEC water well and septic permitting in the case these systems exceed typical capacity.

Topic	Comment	Commenter(s)	Response
	TVA to include additional information relating to the septic system and well in the Final EA.		
Prime Farmland	The findings on the Farmland Conversion Impact Rating form could use clarification. For example, it is unclear why "hay" is listed as the main crop for the area when other crops are predominant in Yum Yum area. Also, the loss of prime and unique farmland may be substantially more than the stated 929 acres, as the site is flat to rolling, has suitable soil types, and has been in agricultural production for over 100 years. By the form findings, it seems TVA seeks to minimize the effects of the loss of farmland by using erroneous numbers that rated the Project Site a few points under the threshold. It would be better to have the form filled out by a neutral party.	Gary Bullwinkel; Katrina Greer; Sheila Jones	Form AD-1006, included in Appendix F of the Draft EA, was completed per the form instructions located at Part 523.61 of the Farmland Protection Policy Act. Areas of the Project Site were deemed "prime farmland" per the US Department of Agriculture Natural Resources Conservation Service (NRCS) designation of such soils, and impacts to areas with prime farmland soils were calculated by overlaying the proposed layout for the Yum Yum Solar Energy Center. Through this process, it was determined that 929 acres containing NRCS-designated prime farmland soils would be impacted by the Project. Neither Tennessee nor any local entities have officially designated any soils in Fayette County as unique or associated with "farmland of statewide importance" or "farmland of local importance;" therefore, these designations were not factors in the analysis of Project impacts to farmland. Hay is listed as the main crop of the area due to being the main cash crop of Fayette County, the geographic area used to complete the land evaluation. The form was completed by an individual who had no other responsibilities in regards to the Project or the overall National Environmental Policy Act process associated with it.

Topic	Comment	Commenter(s)	Response
Public Involvement	The Project has not gone through the county process of analysis, public involvement, and multiple municipal public hearings and legislative body votes, as required per Tennessee's Public Chapter 1101. TVA should hold a public presentation and public comment hearing to discuss the Draft EA; Projects impacts from such a large facility, such as the loss of agricultural land to industrial uses; and alternative site locations. Ahead of the public presentation and/or hearing, TVA should notify a larger group of people about the Project, including members of the minority community adjacent to the Project Site and others within 1 to 2 miles. The lack of notification to the nearby minority residents is a good reason to hold a public comment hearing and presentation in Fayette County and other alternative methods to inform affected residents of NEPA rules and procedures. TVA should allow 30 to 60 days to facilitate the scheduling and holding of such a meeting and to allow for additional public comments on the Project. The request for an extension of the public comment period was also sent to Senator Blackburn. Suggested public meeting locations included Somerville and Fayette County, generally.	Scott Banbury, Tennessee Chapter of the Sierra Club; Ben Bruce; Debbie Bruce; Gary Bullwinkel; Jody Campiche; Diane Graves; JoAnn McIntosh; Becky Rhea; Sam Rhea	Yum Yum Solar is in the midst of the Fayette County-required five-step sequential procedure to determine whether the proposed Yum Yum Solar Energy Center is an acceptable special exception use. This process is detailed in the 2017 Fayette County Zoning Resolution, is specific to approval for solar photovoltaic facilities, and consists of conducting system impact studies, holding public review hearings (Facility Location and Design reviews), and obtaining construction and building permits. The process began in July 2019 with the Fayette County Planning Director sending out letters to all residents within 500 feet of the Project Site to inform them of the upcoming public hearings. The Facility Location Review hearing was held in August and October 2019. At the conclusion of the October hearing, the Fayette County Zoning Board voted unanimously to approve the location for the proposed solar facility. In addition to the hearings, Yum Yum Solar submitted information materials regarding the Project and a set of reports documenting several studies to provide clarity on a number of issues of public concern; these are publically available through the Fayette County Zoning Board. Yum Yum Solar also held a number of local meetings and presentations that were open to the public, advertised a dedicated email address for questions on the Project, and participated in the local Cotton Festival where representatives addressed questions on the Project. TVA deemed the completed 30-day comment period for the Draft EA, the county special exception zoning approval process, and the Yum Yum Solar public engagement activities sufficient for public involvement for the Project and also responded to all individuals and organization representatives who requested an extension of the public comment period. Section 1.3 of the Final EA has been updated with a summary of the public engagement to date and mention of the county special exception zoning approval process.

Appendix H: Public Comments and Responses

Topic	Comment	Commenter(s)	Response
Purpose and Need	TDEC encourages TVA to consider constructing the Yum Yum Solar Energy Center as a microgrid to increase the State's energy security in and near the New Madrid Seismic Zone.	Matt Taylor, TDEC	Section 1.1 of the Draft EA describes the request for proposal to which Yum Yum Solar responded that led to the Project. The RFP was issued in 2017 to help TVA meet immediate needs for additional renewable generating capacity in response to customer demands and to fulfill the renewable energy goals established in the 2015 IRP. Making the Yum Yum Solar Energy Center a microgrid site would not fulfill the intent of the RFP or the customer demands to which it responds.
Regional Climate	The Project may cause changes in the climate in proximity to the solar facility.	Ben Bruce; Debbie Bruce	Section 3.7 of the Draft EA discusses the potential for regional climate changes due to the Project. The Draft EA states that local or regional climate effects could occur, for example, with major changes in land use that affect the hydrological cycle, or that create large impervious surfaces, thus changing the radiative heat balance over a large area. However, vegetation would still grow under and around the solar panels, tending to maintain a landscape with significant evapotranspiration of precipitation, as opposed to creating significant runoff of precipitation that happens with urban development, which can create a "heat island" effect. Therefore, average temperatures of the developed area are not expected to change significantly due to the proposed development.
Socioeconomics (Human Health)	The Draft EA lacks consideration of the risk of adverse health effects through electromagnetic radiation. These effects could result from the magnetic fields associated with large batteries that might store power from the Project. TDEC recommends that TVA consider addressing any potential Electro Magnetic Field (EMF) impacts that may result from the proposed action in the Final EA. If any studies have been conducted regarding these potential Project impacts, these should be presented in the Draft EA.	Ben Bruce; Debbie Bruce; Retha LeBlanc; Karl Peterson; Matt Taylor, TDEC	According to NC State University, photovoltaic technologies and solar inverters do not pose significant human health risks. Photovoltaic systems do generate electromagnetic fields (EMF). However, EMF produced by electricity has enough energy to produce some heat but not enough to remove electrons from a molecule or damage DNA. Humans are exposed to EMF on an ongoing basis with no impact to human health. Moreover, distance from the EMF source, such as provided by the security fencing proposed to surround separate portions of the Project, renders the exposure to EMF insignificant. Therefore, the Project is not expectedly to negatively affect human health.

Topic	Comment	Commenter(s)	Response
Socioeconomics; Cumulative Effects	The socioeconomics section of the Draft EA reports 'positive, long-term, direct impacts to economics and population from Project operation' with no economic analysis, which seems to minimize or hide the detrimental economic effects of replacing agricultural production on prime and productive farmland with a solar facility. The Project would have effects on the local economy due to farmland conversion and the associated loss of agricultural production without local benefit from the Project or chance for higher real estate taxes. The Draft EA lacks analysis regarding the loss of agricultural production in regards to lost income and jobs, land taken out of rental contracts, vendors who lose income, loss of circulation of agricultural monies in the local economy, and other effects. There may be secondary effects, as well, that are not considered in the Draft EA, such as land speculation near transmission lands, the potential devaluation of rural residential property values where TVA solar facilities are installed, and cultural effects to generational farmers and farming families. Decreases in property values may have an increased effect on the area African-American population. Overall, there could also be cumulative effects to the farming areas of Fayette County as outside energy companies seek to lease or buy farmland then use the 'special exception' code to site facilities anywhere in rural zoned areas.	Ben Bruce; Debbie Bruce; Gary Bullwinkel; Debby Butler; Sheila Jones; Karl Peterson	Section 3.13 of the Draft EA provides socioeconomic analysis commensurate with expected Project impacts, both adverse and beneficial. The Project is not expected to have a significant adverse effect on the local agricultural economy due to loss of agricultural production on portions of 25 tracts owned by 14 entities in Fayette County. The Project is also not expected to negatively affect area property values. As discussed in Section 3.5, long-range views from residential farm complexes, agricultural operations, and churches in the Project Area are generally limited by mature trees and farm buildings. In addition, the Project would be set back a minimum of 500 feet from roadways, which would further limit views of the Project. In a property value impact study for the Project, it was concluded that there would be no impact on home values due to abutting or adjoining the solar farm as well as no impact to abutting or adjacent vacant residential or agricultural properties where there are sufficient setbacks and buffering. Section 3.13 has been revised in the Final EA to reflect employment findings of the economic impact analysis conducted for the Project, and Section 4.4 of the Final EA includes an analysis of cumulative effects from the Project when existing or other proposed Fayette County solar facilities are considered.

Topic	Comment	Commenter(s)	Response
Soils	The Draft EA states that the soils would benefit by "natural or noninvasive vegetation" but does not apply soil science principles to the analysis. The Draft EA does not describe the potential effects to Project Site soils that would occur with grading and redistribution of onsite soils. The Draft EA also does not explain how Project Site soil would be effectively restored during the decommissioning and reclamation phase of the Project. The Draft EA should provide soils analysis related to zinc loss, hazardous waste from the solar array, the potential for steel remains of the pilings, and the effects of grading, trenching, and compaction.	Gary Bullwinkel; William Hendry; Karl Peterson	Section 2.2 of the Draft EA states that grading would consist of the excavation, redistribution, and compaction of soils to meet the final design requirements. Potential impacts to onsite soils associated with these activities would be offset by the establishment of low-growing native and/or noninvasive grasses and herbaceous plants as the Project ground cover. Implementation of such vegetation would be cost effective while resulting in the maximum environmental benefit in regards to soil health and biodiversity. According to a National Academy of Sciences (NAS) study, the dense network of roots associated with such vegetation serves as an anchor to hold the soil in place and can reduce soil erosion 20-fold compared to conventional monocrop fields. A US Department of Agriculture (USDA) publication reports that the planned ground cover for the Project naturally captures and converts atmospheric carbon into plant tissue, which is in turn deposited into the soil as natural fertilizer. The Project ground cover would also help reduce bulk soil density while increasing the prevalence of micropores and macropores, which in turn increases land productivity. USDA additionally reports that macropores increase the porosity and permeability of the soil, causing the soils to soak up water during high-rainfall events and then slowly release water into plant roots. Lands established in the proposed Project ground cover have been shown to reduce soil runoff by 37 percent compared with conventional cropland, according to the NAS. The Project ground cover would create complex soil food webs and, thus, accommodate a larger population of beneficial microorganisms, per studies by the US Department of the Interior. Overall, the beneficial effects of the proposed Project ground cover would result in healthier soil than typically results from traditional agricultural practices and would not require soil restoration during the decommissioning and reclamation phases of the Project.

Topic	Comment	Commenter(s)	Response
Solar Facility Operations	TDEC recommends that consideration be given to using electric-powered lawn equipment, which can be as much as 50 percent quieter than traditional gas-operated models. Electric-powered lawn equipment has zero air emissions onsite, reduces petroleum-fuel purchases, and eliminates used oil waste. Similarly, if there is an opportunity to use all-electric portable earthmoving equipment, it would result in reduced noise, air emissions, petroleum-fuel purchases, and used oil waste. TDEC recommends TVA consider these additional details in the Final EA.	Matt Taylor, TDEC	Section 3.6 of the Draft EA states that the periodic mowing required to manage the height of vegetation surrounding the solar panels would produce noise levels comparable to those of existing agricultural operations in the Project Area. Moreover, Project-related mowing would occur at less frequent, quarterly intervals and would therefore have minimal effects on noise levels in the Project Area. Section 3.7 of the Draft EA states that the use of construction equipment would cause a minor temporary increases in GHG emissions, such as local emissions of particulate matter, nitrogen oxides, carbon monoxide, volatile organic compounds, and sulfur dioxide. The total amount of these emissions would be small and would result in negligible air quality impacts overall. Waste collection and disposal would be conducted in accordance with applicable regulatory requirements to minimize health and safety effects, as stated in Section 3.10 of the Draft EA. To the extent permissible, waste would be recycled. Materials that cannot be recycled would be disposed of at an approved facility. No waste oil would be disposed of on the Project Site. Overall, due to the minor to negligible impacts to noise resources and air quality, along with implementation of proper waste management practices, Project activities related to earthmoving and mowing and associated environmental effects do not warrant additional minimization measures that would result in substantially higher overall costs for the Project, such as use of electric-powered equipment.
Solar Facility Operations	The Project may not be properly maintained, and the associated infrastructure could fall into disrepair.	Debby Butler	Project equipment and infrastructure would be properly maintained in order to ensure the Yum Yum Solar Energy Center remains operational, pursuant to the terms of the power purchase agreement with TVA for 20 years from the commercial operation date of the solar facility.

Topic	Comment	Commenter(s)	Response
Transportation	The Project would cause excessive road wear in the Project Area.	Ben Bruce; Debbie Bruce	Per Section 3.12 of the Draft EA, the Project Site can be accessed via routes that do not have load restrictions, and Project construction vehicles should be easily accommodated by the existing roadways in the Project Area. During operations, the Yum Yum Solar Energy Center would be staffed by up to six full-time workers who would live in the area. The addition of vehicles for full-time staff on local roadways would be accommodated by existing infrastructure; therefore, the operation of the Project would not have a noticeable impact on the local roadways. Excessive road wear is not anticipated as a result of the Project. However, as agreed with Fayette County, Yum Yum Solar would mitigate road wear due to the Project by returning the existing roadways to pre-Project conditions during the reclamation phase of the Project.
Utilities	Project activities could cause outages of electrical, telecommunication, and internet services that could be prolonged duration.	Ben Bruce; Debbie Bruce; Katrina Greer	As discussed in Section 3.9 of the Draft EA, temporary utility outages could occur during Project construction, as systems are tested and/or come on-line, but these potential outages are expected to be short term in duration. As per the typical process, TVA would coordinate with Chickasaw Electric Cooperative and other local power companies (LPCs), as needed, to ensure the LPCs could backfeed electricity from other sources, such as distribution ties, if needed and where possible. The LPCs would coordinate with customers if outages are necessary. Utility outages are not anticipated during the operations phase of the Project.

Topic	Comment	Commenter(s)	Response
Visual Resources	The Project would degrade the visual landscape surrounding the solar facility and generally be an "unattractive site."	Ben Bruce; Debbie Bruce; Gary Bullwinkel	Section 3.5 of the Draft EA states that the Project would be set back from SR 59 and SR 222 by at least 500 feet, per Fayette County requirements. Long-range views from the numerous residential farm complexes, primarily along or off of SR 222, Old 59 Drive, Yum Yum Road, and SR 59, are generally limited by mature trees and farm buildings. Likewise, long-range views from the two residential concentrations near the Project Site, along and off of SR 222 and along and off of Wagon Wheel Road, and from Oak Grove Gin and Warehouse and several churches in the Project Area are largely limited by mature hardwoods and pines. Mature trees, combined with the minimum 500-foot setback of the Project, would generally shield views of distant Project elements from travelers on SR 59 and Old 59 Drive. Overall, the relatively stable elevations and the maintenance of existing vegetation along the perimeter of the Project Site would largely shield views from most Project Area vantage points to the Project Site. In addition, if required by Fayette County during Design Review of the project, Yum Yum Solar would plant vegetative buffers to further limit visibility of the Project from specific vantage points, as discussed in Section 2.5 and Section 3.5 of the Draft EA.
Waste Management	TDEC recommends that any wastes associated with the proposed action or its alternatives be managed in accordance with the Solid and Hazardous Waste Rules and Regulations of the State of Tennessee.	Matt Taylor, TDEC	The Project would comply with Tennessee Universal Waste requirements found in the Rules of TDEC, Chapter 0400-11, solid waste processing and disposal, and Chapter 0400-12, hazardous waste management. This is stated in Section 3.10 of the Draft EA and is expanded upon in the Final EA.

Topic	Comment	Commenter(s)	Response
Water Resources (Groundwater)	The Project would cause long-term impacts on soils and the water table due to hazardous waste from the solar array and the clearing of vegetation causing water run-off. These effects may impact well water quality in the Project Area.	Debby Butler; William Hendry	Yum Yum Solar does not anticipate that hazardous waste would be generated at the Project Site during operation of the Yum Yum Solar Solar Energy Center. As discussed in Section 3.10 of the Draft EA, small amounts of hazardous wastes, such as used oil, nitrogen, diesel fuel, gasoline, hydraulic fluid, and other lubricants associated with construction equipment, may be temporarily stored on the Project Site during construction of the Project. These would be stored and managed in accordance with applicable state and federal regulations. Safety Data Sheets for all applicable materials present on site would be made readily available to on-site construction personnel. Special procedures would be identified to minimize the potential for fuel spills, and spill control kits would be carried on all refueling vehicles for activities such as refueling, vehicle or equipment maintenance procedures, waste removal, and tank clean-out. Yum Yum Solar would implement a variety of plans and programs to ensure safe handling, storage, and use of hazardous materials (e.g., Hazardous Material Business Plan and a Spill Prevention, Countermeasure and Control (SPCC) plan, if required). Solar panels are safe to touch and contain limited amounts of toxic materials that do not endanger human health. As discussed in Section 3.3 of the Draft EA, the PV panels would have a relatively minor effect on groundwater infiltration and surface water runoff because the panels would not include a runoff collection system; rainwater would drain off the panels to the adjacent vegetated ground. Project activities could potentially cause erosion resulting in the movement of sediment into groundwater infiltration zones. However, best management practices, such as those described in TVA's A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Construction and Maintenance Activities, would be used to avoid contamination of groundwater from Project activities. Additionally, as discussed in Section 1.4 of the Draft EA, Yum Yum Solar and the construction contractor would develop a site-specific Stormwater Pollution Prevention Plan (SWPPP) that would address all construction-related activities from the date construction commences to the date of termination of permit coverage. The SWPPP would be prepared in accordance with good engineering practices and would be

Topic	Comment	Commenter(s)	Response
			consistent with the requirements and recommendations contained in the Tennessee Erosion & Sediment Control Handbook.

From: Scott Banbury
To: Cates, Jacquelyn Taylor
Subject: Sierra Club Requests a Public Hearing re the Yum Yum Project
Date: Tuesday, October 15, 2019 5:05:50 PM

TVA External Message. Please use caution when opening.

The Sierra Club members of Fayette County request a public hearing on the Yum Yum Solar project.

--

Scott Banbury, Conservation Program Coordinator
Tennessee Chapter of the Sierra Club
[redacted]

"When we try to pick out anything by itself,
we find it hitched to everything else in the Universe"
- John Muir

From:	Debbie Bruce
To:	Cates, Jacquelyn Taylor
Subject:	Yum Yum Solar Farm
Date:	Thursday, October 17, 2019 12:52:05 AM
Attachments:	TVA Letter.docx

TVA External Message. Please use caution when opening.

Please see attached letter
Thank you

October 16, 2019

Tennessee Valley Authority,

We are writing this letter to express our concern regarding the proposed Yum Yum Solar Project in the Somerville TN area.

Many of the residents in the Yum Yum Community have lived here for generations and a percentage of them do not desire to have an industrial site in their area. Some residents who have chosen to move into the area, as we did, have the same appreciation for the land and are also opposed to such a facility.

There is great concern of the possibility of adverse effects to the community: habitat loss, risk of adverse health effects to those living very near the panels thru electromagnetic radiation, possible changes of climate in proximity of the solar farm, wear of the roads being used to transport equipment, disruption of cell phone/internet capabilities which is already compromised living where we do, reduction of property values, absence of environmentally friendly disposal of non-functioning panels, unattractive sight for those residents surrounding the panels and more.

We have been residents in the Yum Yum Community for 15 years. We intentionally moved to this area because of the flora and fauna found here. Our home is located within 2 ½ miles of the proposed site.

Fortunately, it was noted in the draft that the wildlife within the proposed area will be controlled in a humane way using a catch-and-release program. Unfortunately, this disrupts other ecosystems. What is the survival rate for those being introduced into other habitats? Habitat degradation. As you well know the impact on individual species can have a ripple effect throughout a habitat.

> "When solar farms remove species within a habitat, they also remove valuable ecosystem services that they provide to the habitat." (from article written by David C. Laine)

Within our 16 acres we have identified many mammals, reptiles, amphibians and have documented 88 species of birds. We have had breeding Wood Thrush each summer and have also noted Yellow-Billed Cuckoo, both whose conservation counts are already on the decline. An additional 11 bird species could be added to the count of 88 since the pond at our neighbor's yard draws in species specific to their habitat. Their pond being just 1 mile south of us which would be a mile closer to the proposed site.

> "While renewables in general, and solar power in particular, have been touted as generally benign with regard to environmental impacts, some solar projects that have recently been placed in service reveal that mortal risks to wildlife, and especially avian species, are likely to demand additional consideration and management. "

This statement from article Impact of *Solar Energy on Wildlife* by subject matter expert Dusty Miller. Mr. Miller goes on to note that many birds, particularly water birds, have been killed at large solar sites due to the "lake-effect "of the panels.

Cornell Lab of Ornithology this past month released shocking data that quantifies for the first time the total decline in bird populations since 1970 in the continental U.S. and Canada at 2.9 billion breeding adult birds, 1 in every 4 birds! As stated by Rosenberg, of the Cornell Lab and American Bird Conservancy states, "these bird losses are a strong signal that our human-altered landscapes are losing their ability to support birdlife and that is an indicator of a coming collapse of the overall environment."

Alternative energy, no matter how "environmentally friendly" does not have a place in an area which would disrupt breeding areas and would be in a migratory corridor for such wildlife.

We are in favor of alternative energy but not at the expense of using green areas nor at the expense of using fertile farm land and the residual effect it will have on the area. Brown ground would be a better choice for said project. A prime example would be the solar panels surrounding the landfill in Somerville. Better yet, there are plenty of roof tops of commercial buildings throughout the state which would be prime candidates for such a project. Allowing solar farms to enter the area will entice more solar farms to use green/agriculture land for nothing more than power generation.

We would request that TVA please hold a public comment hearing and to allow 30-60 days to facilitate the scheduling of such meeting.

Thank you for your time and attention to this matter.

Kind regards,

Ben and Debbie Bruce

[redacted]

[redacted]

From: Gary Bullwinkel
To: Cates, Jacquelyn Taylor
Subject: Bullwinkel comments for Yum Yum Solar Draft EA
Date: Thursday, October 17, 2019 10:59:20 PM

TVA External Message. Please use caution when opening.

Taylor:

Please accept these comments on the Yum Yum Solar EA.

We request TVA to hold a Public Comment hearing and extend the comment period 30-60 days to facilitate the scheduling and holding of the hearing.

Thank you,
Gary Bullwinkel
[redacted]

[redacted]

Comments on TVA Environmental Assessment for Yum Yum Solar Project in North Fayette County, TN

Gary Bullwinkel
[redacted]

Scope

The Scope of the Environmental Assessment (EA) is not adequate. The affected environment of such a large scale industrial project affects land use, agricultural production, land values and socioeconomics of ag producers in the surrounding area. The location of transmission lines and farmland offers opportunity to energy companies to create new operations.

The Scope of the EA just be expanded to the transmission right of ways near the project and within Fayette County since TVA and Yum Yum Solar was granted permission for the location using a "special exception" land usage from the Fayette County government.

For such a large project with unknown Cumulative effects, dramatic degrading effects on productive farmland and complex negative effects on local waterways, an Environmental Impact Statement (EIS) should be prepared instead of the EA. Among other things, the assumptive conclusions of the preparers and the lack of consideration of Reasonable Alternatives show that a full EIS should be done with an expanded geographic scope, a fully reasoned treatment of the Cumulative effects of the loss of farmland from this Solar Farm in this area and other areas that are or proposed in the future and a study of Reasonable Alternatives to the use of other locations and methods of generating renewable energy for TVA use.

Permits and Approvals

TVA does not discuss the use of the controversial Fayette County zoning code "special exception" that allows a small Board of Zoning Appeals to give a permit for 4003 acres of industrial development in a rural residential area that is protected by the Tennessee State 1101 Growth Plan law and by the limitations of the Tennessee State law that enables a Board of Zoning Appeals to allow exceptions to existing land use if the exception use is "in harmony" with the existing land use.

Nor does TVA discuss its role in the development of the Fayette County special exception code during the preliminary preparations of the TVA/Invenergy/large landowners leasing and project planning during the timeline of 2016 – 2019.

The use of rural zoned farmland for Solar Utility use has thrown the farming areas of Fayette County into a destabilizing mode as outside energy companies seek to lease or buy farmland at discounted agricultural price levels but then use the "special exception" code to place any size facility anywhere in the rural zoned areas.

TVA does not discuss its vital role as a monopolistic supplier of energy and its role and position and desire for Solar Energy as a driver to fundamentally changing land usages across Tennessee, Fayette County and other Counties that have Transmission line access and large areas of rural land along that transmission line access.

Reasonable Alternatives

TVA fails to discuss Reasonable Alternatives to the production and delivery of renewable electricity to the grid or to local users, which in this case do not receive any of the proposed energy from the 4,003 acres industrial site that displaces 3,000 acres of agricultural production.

TVA has many square miles of available land in easements for their transmission lines. They do not discuss why or how that could be used instead of prime or productive farmland.

There are many areas that have smaller fields or open areas that are not used or are marginal agricultural lands that are available to a more distributed approach to harvesting Solar Energy. TVA does not explore this or other alternatives that are available and known or knowable by TVA.

TVA has a restrictive solar policy in its relations to the electric cooperatives of Tennessee. The cooperatives have the legal ability to raise bond money, generate electricity and manage easements and other infrastructure that could be used to create "community solar systems" that could provide smaller but significant solar generating capacity in distributed and multiple locations in their service areas. TVA requires that solar other than wholesale solar that goes direct to the TVA grid at wholesale prices be tied to metering regimens that discourage innovation and cooperative provision of power to its members.

TVA does not address these reasonable alternatives as far as land usage, TVA easements and TVA restrictive policies. This lack of alternatives serves TVA business model but not the present and future needs of local residents and their membership cooperatives.

Project Description

TVA represents the 4,003 industrial site as "adjacent" to a commercial (cotton gin) and an industrial development 2 miles away. That industrial development is 88 acres of small businesses, commercial and light industrial park that is 2 miles north of Somerville. There is a growth area two or three miles away on I-40 but it has no zoning or development. This description is lipstick on a pig, the project is an industrial activity placed in rural land use on prime and productive farmland.

Alternatives eliminated from Further Consideration

This section merely states that TVA wants rural, open land that is near to transmission facilities that has appropriate zoning. They report no alternative location within this narrow definition and no other alternatives as suggested above.

Comparison of Impacts

The table of Impacts is a simple No Direct Impacts for the No Project Alternative.

TVA obfuscates and/or avoids analysis and documentation of the detrimental effects ot the following categories:

Land Use – a very controversial use of the permitted use/special exception that is allocated to the jurisdiction of a local Board of Zoning Appeals by TN State Law and in R-1 Rural Residential areas in Fayette County is limited to less than 3 employee home businesses including wedding venues, bed and breakfast and now unlimited size Industrial Utility Scale Solar Electrical Generating facilities. State Growth Plan law 1101 clearly states that once a county and its municipalities establish a county wide zoning map designating rural, future county growth areas and municipal growth areas these land uses are NOT to be changed by any County legislative or planning body. The limits on the use of a special exception as set by state law do not include spot zoning industrial sites into arbitrary locations in the Rural Residential areas.

TVA's policy of supporting a 4,003 acre industrial land use change by a county zoning code "special exception" that is in contradiction to State law is an arbitrary act of a Federal agency of choosing or even encouraging counties to thwart State zoning laws to enable special interests and/or landowners to speculate and create leasing frenzies in areas that are zoned to protect open spaces and agriculture.

Geology, Soils and Prime Farmland – Impact to Soils ignores and fails to assess and apply soil science principles to the analysis of benefits. In the row of the panels, TVA spells out that galvanized steel supports would be pile driven to depths of 7-12 feet. There is no consideration of the long term effects of introducing up to 80 or more such steel supports per acre X 1,624 acres = 129,920 significantly sized galvanized steel spikes into the soil profiles of the multiple soil types on the site made up of prime and unique farmland. Other possible detrimental effects are caused by trenches filled with cabling and other foreign materials that would also be subject to long term degradation. Despite material and engineering sciences that are firmly established, TVA makes no assessment or analysis of these effects. Well know to farmers and soil scientists the effects of soil compaction on soil profiles is a long studied and critical factor to the quality of soils for the use of agriculture. TVA makes no no assessment or analysis of these effects.

TVA only claims that while in operation that adverse impact soils would benefit slightly by "natural or noninvasive vegetation". This ignores the documentation by TVA that extensive grading might occur causing the removal of topsoil, tens of thousands of steel beams pile-driven deep into the ground, years of compaction by the access lanes between rows of panels.

The loss of Prime and Unique Farmland is not 929 acres but substantially more. The site was chosen for the flat to rolling topography, suitable soil types and access to transmission facilities. The site chosen is in agricultural production and has been in agricultural production for over 100 years. TVA makes no no assessment or analysis of these effects. TVA failed to properly assess the prime and unique (productive) farmland and reports erroneous effects. TVA further seeks to minimize the effects of the loss of farmland caused by their action by saying they are only removing the land from "potential" agricultural use. TVA failed or deliberately chose to use erroneous numbers on the Farmland Protection Policy Act 1006 worksheet that establishes a threshold of whether or not the agency should explore alternatives when they have an action that will take significant farmland such as the farmland on the project site out of production.

TVA's corporate narrative that is repeated in several of its Solar Environmental Assessments is that whatever effects are caused by the "temporary" 25 year life of the Solar Farm will be restored when the land is decommissioned. That is an assertive statement with no basis and no pretense of a basis. There is no assessment and analysis of how 130,000 steel beams will be removed and what the effect of the zinc loss does to the soil much less the large steel fragments that could remain in the soil. TVA speaks of grading top soil and replacing it in the future but have no quantification or qualification of the soil science and engineering techniques that it would take to restore such land after grading, trenching, compaction and other non-agricultural actions

SocioEconomics – TVA reports "Positive, long-term, direct impacts to economics and population from Project operation" with no numbers or assessment or analysis of the effects of replacing up to 3,000 acres of agricultural production with Solar Panels. 3,000 acres X an average of $600 per acre of production costs and profits =$1,800,000 of agricultural costs and profits that circulate many times and many ways through the Fayette County economy. 2500 acres X an average of $400 per acre of lease payments = $1,000,000 which will go to owners some of whom do not live in the county.

The extra taxes raised are to be subtracted from the owners lease payments and do not circulate through the economy like the agricultural production costs and benefits that ag produces. There is no SocioEconomic assessment or analysis. TVA only offers assumptive statements that have no basis and simply support their desire to minimize and hide the detrimental effects of replacing agricultural production on prime and productive farmland with a solar panel desert.

These are rough, estimated numbers but TVA offers no numbers. Economic analysis requires numbers. TVA failed to follow NEPA regulations by using appropriately trained professionals to give pertinent scientific analysis to inform decisionmakers. They have failed.

TVA makes no no assessment or analysis of the socioeconomic effects of this loss of agricultural production on the agricultural community as far as jobs, land taken out of rental contracts, vendors who lose income and other effects that are not looked at all. Other detrimental effects are possible land speculation on agricultural land near transmission lands and the possible correlation of devaluation of rural residential values in those rural areas that become industrialized because of TVA solar policy.4

Environmental Justice – TVA does a terrible job of their assessment of the effects of having such a huge solar facility changing the landscape of their living environment, the loss of agricultural jobs and a degraded visual landscape.

Using a census tract analysis to estimate the effect on the local minority is insulting and shows callous disregard to the humanity of the minority residents who live RIGHT NEXT DOOR or SURROUNDED BY the largest Utility scale Solar energy generating facility in the Southeast.

Fayette County actually gave notice to some residents, black and white, and ignored their next door neighbors when giving them notice of the public hearing for the special exception application. These residences are described in the Affected Environment portion of the report but ignored in the Environmental Justice subject.

If a black family's home loses 10% of its value because the zoning has been functionally changed from rural to industrial that can represent a significant part of their life savings, i. e. the equity in their home.

The treatment of the minority residents is another reason TVA should have a Public Comment hearing and presentation event in Fayette County. TVA should reach out and use alternative methods to inform affected residents, black and white, who otherwise are not informed or informationally prepared to sort out the significance of NEPA Environmental Assessment rules or procedures.

The Preferred Alternative

TVA says the project alternative would generate renewable energy for TVA and its customers with only minor and indirect effects on the human environment of the project and Fayette County area. This is not true and has no basis due to the lack of assessment and analysis on the multiple subjects above.

Fayette County TVA customers would not benefit from the project, they would receive very little if any of the solar energy and the local and county economy would suffer while TVA, Invenergy and a few large landowners would make more money but large portions of it would be taken out of county.

The agricultural lands will become industrial facilities with a possible future of blighted spoiled land due to the alterations made by the project.

Irreversible and Irretrievable Commitments of Resources

TVA repeats its assertion that "Because removal of the solar arrays and associated on-site infrastructure could be accomplished rather easily," that Resources are not being lost. TVA makes not assessment or analysis how this will be accomplished. How do you remove steel beams that were pile-driven into the ground 25 years previously? How do you restore soil profiles that have been graded, removed in places, trenched and compacted? How is that done easily? What will be the results? TVA does not know and just gives a narrative instead of a real analysis and assessment.

The lack of studies, real assessments and analysis and the huge size and real impact to the land, socioeconomics connected with the degradation and removal of production from the land shows that an environmental impact statement is required and needed for this project. The effects on the local population including the minority residents who make up over 60% of the residents in the area surrounding the project emphasizes this need for an EIS.

Cumulative Impacts

TVA narrows the consideration of cumulative impact to Federal and local projects but does not consider the cumulative impact of more solar farms being placed on farmlands in Fayette County and the cumulative negative impacts of those actions.

From:	Gary Bullwinkel
To:	Cates, Jacquelyn Taylor
Subject:	Fw: Fayette County TN - TVA Draft Environmental Assessment - Request for Public Presentation/Comment Session
Date:	Monday, October 7, 2019 5:08:40 PM

TVA External Message. Please use caution when opening.

You warned me! jtcates it is!

gb

----- Forwarded Message -----
From: Gary Bullwinkel [redacted]
To: jcates@tva.gov <jcates@tva.gov>
Sent: Monday, October 7, 2019, 03:26:24 PM CDT
Subject: Fw: Fayette County TN - TVA Draft Environmental Assessment - Request for Public Presentation/Comment Session

Ms. Cates:

Thank you for your time today on the phone. Am forwarding you the note I prepared for Senator Blackburn's office. Daniel is her legislative aide for energy/TVA issues.

Thank you and we appreciate TVA's attention to this matter of increased public participation on an important but controversial project in our district.

gb

----- Forwarded Message -----
From: Gary Bullwinkel [redacted]
Sent: Monday, October 7, 2019, 02:44:16 PM CDT
Subject: Fayette County TN - TVA Draft Environmental Assessment - Request for Public Presentation/Comment Session

Daniel:

Hello, my name is Gary Bullwinkel and I am a member of the Yum Yum Concerned Citizens, a local group of rural residential homeowners and landowners from the immediate and surrounding area of a proposed 4,003 acre (6.25 square miles) utility scale solar electric generating facility.

We would like Senator Blackburn's assistance and support in requesting a public presentation/public comment session to be held in Somerville, TN in regard to the Yum Yum Solar Project as described below. This project is an unprecedented huge solar facility placed in an rural residential zoned area and will take over 3,000 acres of prime and productive farmland out of production.

Some of the effects identified by TVA are the huge size and impact of this project on farmland acreage and the socioeconomics of the corresponding loss of agricultural production. The location of the facility next to a large rural minority neighborhood has raised questions about the lack of adequate direct notice of the project to these citizens and other rural residents next to and near the project.

We have questioned and opposed the precedence of allowing solar facilities to be arbitrarily placed in any rural area in Fayette County (and Tennessee) when the TN State 1101 Growth Plan law specifically forbids the placement of industrial sites in rural land use areas without going through a rigorous countywide process of analysis, public participation and multiple municipal public hearings and legislative bodies votes.

****
*** Our request *****
****

In the light of such a complex array of Federal, State, local and public concerns and issues, we think it would be a good and necessary action on TVA's part to hold one of their Public presentation/Public Comment hearing meetings in Somerville, TN, county seat of Fayette County.

We would also request that the Public Comment period be extended to 30-60 days to be able to schedule, give notice and hold such a meeting and allow the public who attend adequate time to give comments after such an informational meeting. The public comment period currently ends on October 16th, 2019.

We also request that TVA take the effort to provide direct notice to a larger group of people next to and near the site that would include all the local minority residents and other residents within 1-2 miles from the rural site that covers several square miles of land along several rural roads.

We appreciate our public representatives' interest in such public participation events and the need for governmental response to citizens' requests for such events. Please respond with your response to our request.

Thank you,
Gary Bullwinkel
[redacted]

TVA Contact

For more information about the environmental review contact:

J. Taylor Cates
NEPA Project Manager

jtcates@tva.gov
1101 Market Street, BR 2C-C
Chattanooga, TN 37402

TVA - Yum Yum Solar Project

TVA - Yum Yum Solar Project

" Under the terms of the conditional PPA, dated November 9, 2018, TVA would purchase the electric output from the solar facility for an initial term of 20 years, subject to satisfactory completion of all applicable environmental reviews. Together, the proposed Yum Yum Solar Energy Center and TVA's proposed switching station, TL connection, and PPA with Yum Yum Solar are herein referred to as the "Project" or the "Proposed Action."
The proposed Yum Yum Solar Energy Center would occupy portions of 25 individual tracts of
land, which in their entirety encompass nearly 4,003 contiguous acres in rural Fayette County,
Tennessee, southwest of the unincorporated community of Yum Yum. Invenergy secured land
rights from the owners of the individual tracts to construct the solar facility on their property. The portion of the 25 tracts proposed for solar development encompasses approximately 2,639 acres, . . ." - Description of Project from TVA EA - Yum Yum Solar Farm

From: Debby Butler
To: Cates, Jacquelyn Taylor
Subject: Yum Yum Solar Project - Go Away!
Date: Monday, September 23, 2019 9:08:44 AM

TVA External Message. Please use caution when opening.

As a resident of Fayette County I am writing this for my Yum Yum neighbors. The Yum Yum Solar Project needs to be halted.

This 4003 acre solar project (2639 acres used to construct) negatively impacts our environment, legal preserved land for agriculture, and individuals who purchased their land decades ago to build what they thought was their forever homes for their families.

I can't imagine sitting outside in the peaceful country with glaring solar panels instead of agriculture land, woods and beautiful wildlife.

Negative impacts include but not limited to:
- Peaceful quality of life
- Agricultural land
- Farmers income from agriculture
- Well Water quality
- Decline of residence property values
- Lack of sun required around surrounded areas
- Wildlife impacts
- Maintenance of facility
- Unknown TVA Power Impacts to Fayette County Residents

- Lack of maintenance when infrastructure begins to deteriorate and turns to blight.
- Time and quality of land to turn back into agriculture farming once torn down
- All other unknowns 10 years ahead

Why was Fayette County, TN selected for this project?

There are plenty of other areas in TN without residents living in close proximity. Leave us alone. Go build it there, not here in Fayette County!!

Regards,
Debby Butler
[redacted]

Name: Sam Dornan

Comments: I'm absolutely in favor of this project. Anything that gets us closer to 100% renewable energy is a positive development and should be encouraged.

close window

Name: william garnett

Comments: I am totally in favor of the Yum Yum Solar Project. I believe it is a positive step in providing clean renewable energy and will have a positive impact on our area and the environment. This can be a model for the blending of agriculture and energy production.

close window

From:	Katrina Greer
To:	Cates, Jacquelyn Taylor
Subject:	Yum Yum Solar Energy Center Draft Environmental Assessment, Somerville TN
Date:	Thursday, September 26, 2019 4:26:13 PM

TVA External Message. Please use caution when opening.

If I want to officially complain about things in your report that I think are wrong, who do I direct my comments to? You, or someone else?

Katrina Greer
[redacted]

Name: Katrina Greer

Comments: 1) My home is within the 'area of potential effect to cultural resources' and also within the 'project area.' My home was built before the civil war. Why is my home not listed as an archaeological site or resource?
2) Regarding the Farmland Conversion Impact Rating why do you have the main crop listed as 'hay' when your map 'Land Cover in the Project Area' clearly shows 'cultivated crops' as the main use of the land. Everyone here knows that land is used for cotton and corn mostly, and only a small portion is used for hay. This whole form seems to have been created so that the number at the bottom would end up being just a few points shy of the cutoff. I request that this form be filled out again, by someone else--preferably an unbiased person.
3) Why was no other site looked at? Surely there are better places to put solar panels than on top of prime farmland!
4) I am an author. I moved here for the peace and quiet and so that I could write in peace. My house is listed as a 'noise-sensitive receptor!' Now you are telling me I have to listen to loud pile drivers and construction vehicles for 20 months! 20 months! I protest this direct interference with my ability to make a living! Who is going to monitor all this noise?
5) Your report says we should plan to experience outages in electrical service and telecommunication services. I also have an online retail business. My livelihood depends on my cell phone and internet service. I cannot be without them. Even 24 hours is too long, and will interrupt my commerce. Your report also says that these same outages will occur during regular maintenance, however, it neglects to say how often we should expect this regular maintenance. Do you even know? Are you planning to put me out of business in every way possible?

close window

Name: Patricia Marshall

Comments: I have recently learned that solar power for the Clarksville Google plant will be coming at the expense of loss of 4000 acres of prime farmland in Fayette County, TN. It is a pitiful SHAME that TVA would put farmers and solar proponents against each other. There are numerous options for the sighting of solar farms. The obvious that comes to my mind is to use already existing asphalt-covered parking lots. These are 'heat islands' and the shade provided by the solar panels would be welcome relief for the cars parked underneath the panel arrays; not to mention the VERY efficient use of space. It is a win-win solution! I have seen this done very successfully in Europe when I visited 8 years ago. Ideally, every large parking lot could be covered with solar arrays; and obviously the Google plant parking (as well as roof) should be. Other sites for locating solar arrays would be thousands of acres of TVA right-of-ways, capped landfills, roofs of government buildings, arenas, colleges and schools, large warehouses and factories.
I'm sure the creative brains of TVA can come up with better site locations than the farmlands that we are going to need to grow food for our planet's burgeoning population.

close window

From: Michael Owen
To: Cates, Jacquelyn Taylor
Subject: YUM YUM
Date: Monday, September 23, 2019 4:35:29 PM

TVA External Message. Please use caution when opening.

Taylor: I am Michael [redacted] A [redacted]. We do erosion, sod, and seeding work in the Memphis area. I would like the opportunity to work on the Yum Yum project. Please let me know who I need to contact for a opportunity. We would do our best to make sure the TVA has a good project.

Michael Owen
[redacted]

23 September 2019

Tennessee Valley Authority

ATT: J. Taylor Gates, NEPA Specialist

1101 Market Street, BR 2C-2,

Chattanooga, TN 37402

Re: Comments on Yum Yum Solar Project, Fayette County

As we own about 1,500 acres of farm land a few miles from this proposed project we appreciate the opportunity to comment on this program.

As to environmental impact, there is going to be over 10 miles of fencing around the 4,003 acres the project proposes that wild animals large or small cannot cross. This means the trails for these animals to water and seek shelter will be lost to them. That is not an environmental impact ?

There are some big natural gas transmission lines very close to the proposed site carrying gas from Texas and the Gulf to New Jersey. They could easily supply gas to run generators 24 hours a day regardless of the amount of sunshine and have a "project footprint" one one hundredth (1/100) the size of the 4,003 acres. That is not a lesser environmental impact ?

And let us move on to the clean up of the entire site after the expiry of the lease by Invenergy; They say they will provide a bond that will remove all the concrete pedestals for the solar panels, the panels themselves and all the underground cables, and roadways. But the topsoil that was moved to level the site cannot be redistributed as it once was nor will it. So there will be areas of just clay and hardpan surface and areas remaining with some organic material. The amount of these areas stripped of topsoil have not been made know to the public but they have to be very large knowing the size of the tracts and the terrain.

This is not a large environmental impact ?

Now we need to talk about the bond itself or the guarantee to clean up the site at the end of the lease. Invenergy gives no information on who will issue such a bond and how it will read. Invenergy themselves only have an S&P rating of B+. B+ for S&P says that rating is "relatively risky with a higher than average

chance of default". Considering that Invenegy will flip the the project once they turn it on and perhaps the buyer will assume the guarantees that he will clean it up at the end of the lease. But there is no evidence of that which has been presented. Of course the landowners are the ones to have to look out for this clean up performance but now they are like the deer in the headlights on dreaming of the 20 years of rent about 3 times what they can farm off the properties.

So how do the neighbors and other interested citizens of Fayette County, Tennessee assure themselves that this large site will be returned to its initial state ? Invenergy has presented no draft bond by an identified, financially strong third party. Nor can we rely on whether that entity might will still be in business in 20 years. Invenergy is going to say they will give the guarantee or bond because they have not yet organized to sell the project until they have it approved and have the construction financing in place. This is where the argument fails.

And this clean up or lack of it is a potential big environmental impact.

Finally, the Zoning Invenergy is seeking is very vague on "Storage" of the power generated during the hours of sunshine. But the granting of the building permit and Zoning approval may be very broad for Invenergy.

Everyone knows that is the next big step from a technical standpoint with solar and wind farms. There has been, as far as we can see, any consideration of the impact of large batteries storing the power produced by the solar cells during the day so that it can enter the grid during the night or during cloudy days. That much battery storage has to generate so magnetic fields that depending on where they are placed could have an impact not yet known.

The county does not need this program. It occupies about 1% of the total land area in the county and the additional real estate taxes generated above the existing Greenbelt tax levels are very low.

We hope you will consider the above..

Karl B. Peterson

Karl Peterson [redacted]

From: beckyyrhea
To: Cates, Jacquelyn Taylor
Subject: Yum yum solar project
Date: Thursday, October 17, 2019 5:48:49 PM

TVA External Message. Please use caution when opening.

We are writing to request a public presentation be held in Fayette County by TVA concerning the Environmental Assessment for the Yum Yum solar project. We are also asking that the period for public comments be extended to a date after a public presentation takes place in Fayette County.

The installation of a solar facility of this magnitude in rural Fayette County should at the very least warrant a public hearing by TVA. As lifelong residents of Fayette County and with the 5th generation connected to Yum Yum, we are extremely concerned with the practice of taking agricultural land out of production to become industrial.

Sincerely,
Sam and Becky Rhea
Jamie Rhea
Courtney Rhea
Carl and Lee Ann Thornton

Sent xy Tab A

From:	jhtapp9
To:	Cates, Jacquelyn Taylor
Subject:	From Joseph Tapp, [redacted] . I live next to a 350 acre field that will be taken in by the yum yum solar project. Needless to say I am very concerned about the impact this will have on my property as my west property l...
Date:	Saturday, September 21, 2019 8:49:44 PM

TVA External Message. Please use caution when opening.

Sent via my Samsung Galaxy, an AT&T 4G LTE smartphone

Name: Barbara Garnett

Comments: I am very much in favor of the Yum Yum Solar Project. We are in the relatively early stages of a true climate crisis, and I think the best solution is to move toward renewable energy. I believe solar energy is the best source of renewable energy to date, and I appreciate that TVA is moving in this direction. I hope that more projects such as this one will alleviate some of the damage done to our environment.

While the planning necessary to make a large project such as this successful can be long and tedious, I believe Fayette County and Invenergy have made a solid beginning and will be able to do so without question.

Thank you for allowing public comment on the Yum Yum Solar Project.

Barbara Garnett

close window

Name: James Garnett

Comments: My family and I fully support this project. My parents own part of the land being utilized in this project and currently live in our family home next to the project's border. We have independently conducted our own research and met with Invenergy. After researching we have found the Yum Yum Solar Project to be a wonderful use of our land as a method to provide a stable and sustainable supplement to the rest of our farm.
I like hearing that TVA is seeking and investing in methods to increase renewable energy sources in their portfolio. It will take many forms of energy working together to solve the climate crisis while still meeting the energy needs of America. Projects like the Yum Yum Solar Project provide steps toward ensuring a sustainable future.
I see very little and limited environmental impact on the land and many positives in giving the land an opportunity to rest and recover. The inconvenience to the community during the construction phase will be minimal and planned accordingly. Once constructed the site is situated in such a way to ensure it is not visible from the boundaries and is naturally concealed.
Again, I support this project and appreciate the work TVA and its partners have put into their commitment to expanding their portfolio to include renewable energy.

close window

Name: William Hendry

Comments: This solar project is unprecedented in its size of 4,000 acres (6 square miles), to be placed in the middle of land zoned 'rural/residential.' As an adjacent landowner, I am very concerned about the long-term impact hazardous waste from millions of solar arrays will have on the soil and water table from which I get my water. I am also concerned about water run-off from land denuded of vegetation that will affect my property. Even with the current planting of crops in the land above me, I have had to take extensive measures (installation of a pond, etc.) to control flooding. I can't begin to imagine what it will be like after solar panels replace vegetation.

I am also very concerned about the impact 6 square miles of fencing topped with barbed wire will have on local wildlife habitat and migration. Deer, fox, rabbit, raccoon, coyote, skunk, bob cat, and a host of other species will be dramatically affected and forced into our rural residential properties. I would also like to know the impact upon foul flying over this massive expanse of solar arrays. My understanding is that birds who fly too close or too low over arrays drop from the sky having been 'cooked' by the intense solar energy reflected back into the atmosphere. We have many protected species of bird in our rural community to include numerous variety of hawk and owls, duck, geese, turkey, and even a bald eagle. Are these things being evaluated?

I would like to request a public hearing from TVA to our community to address their findings and allow residents to ask questions or express their concerns.

close window

Name: Shelia Jones

Comments: To Whom It May Concern,

Hello, my name is Shelia and I am concerned resident of the Yum Yum community. I moved here last year after marrying my husband. Although, only two hours away from where I grew up, it was a big step for me. My husband is a row-crop farmer. His family has roots in Fayette County that go back through several generations. Farming is more than an occupation to us and our family, it is in our DNA. Many young farmers simply cannot make a living in today's world with the inflation of input costs and market prices, however we keep pushing through. It is not easy by any means, but the thought of " If we give up, then who will feed and clothe the next generation?" is more than enough motivation to keep moving forward. I stated all the above so by this point you know a little of my background and my motivation before I present my thoughts on this project.

I read the draft and the appendix of the environment assessment that you all have done on behalf of the Yum Yum Solar Project. I understand that you all have a lot of megawatts of solar energy that you need to produce in the state of Tennessee. I do not think solar energy is necessarily a bad thing and would most likely not be concerned if the project was not so large and not taking so much prime farm land out of production. An open area of land makes an appealing location for solar panels because it is "easy". There is little to no tree removal and it is easily accessible. I can appreciate that this is cost efficient… but is it for everyone? This project is taking a substantial amount of land out of production. It bothers me the most that no other alternative site was proposed. Food for thought… If you could build a house anywhere in the state would you not look at several locations until you found the perfect spot?

Part of the EA was a form required by the Farmland Protection Policy Act. This act requires you to fill out a form because you would be removing farmland from production. The company you hired to perform this EA filled out a form regarding the prime farmland in the site location. The form in the appendix is incomplete, but I gave you the benefit of the doubt… maybe that is because of this being a "draft". If in the final report there is no change, then I would have some questions as to why HDR did not complete what they were required to do. Anyway, I found the NRCS manual for filling in the form and went over each individual score. Our total was 158. That is only 2 points away from 160. A score of 160 would have suggested looking at an alternative site. Then I looked at who gave us this score. His name is Mr. Jason McMaster. I thought to myself "How could he come up with an accurate score if he did not do this assessment on site?". It seems that the score was articulated to be under the 160 mark, so no other actions would be necessary and no alternative sites would have to be considered. I went ahead and spoke to the state soil scientist for NRCS. He stated that he had not seen this farmland conversion impact rating and that he was the sole person who completed and filed the form for the state. Since there are portions on the form that are to be filled in by NRCS, then who actually filled them in? Among the blanks are date land was evaluated, reason for selection, and various other dates. Mr. McMaster's name is listed in the box for as the person completing the form, but that section is labeled to be filled out by NRCS. According to the EA, Mr. McMaster is an employee of HDR and not NRCS. So my question to TVA is… Why are we not considering an alternate site? Why do we have to take some of the most valuable soil in Tennessee out of production? Our county revenue revolves around farming. We have several business in town that are there just to meet the farmer's needs. The effects of this project will go much deeper than the few families that were previously renting this ground. This project and any others in the future that decommission our farmable land will have a huge impact on our local economy.

In closing, on the state seal of Tennessee it states agriculture and commerce. Agriculture is the livelihood of so many of our residents. Our state is proud to help feed and clothe the world. I am asking that TVA will evaluate and consider another site location for the solar project. It may be difficult and you may have to get creative, but the megawatts you need of renewable energy can be achieved without taking productive farmland out of production. I am also requesting that you hold a public presentation and comment session. We would love to welcome you to our community to share information, concerns, and ideas. Thank you for your time.

Sincerely,
Shelia Jones

close window

Name: JoAnn McIntosh

Comments: I am a resident of Clarksville-Montgomery County, the location of the Google plant that will be using the solar power provided by the Yum Yum Solar Project. While I am very keen on Google using solar power, I do not want to see thousands of acres of farmland sacrificed when there are alternative locations available such as TVA right-of-ways, landfills, parking lots, rooftops, etc. Please do the residents of Fayette County the courtesy of scheduling a public meeting in Somerville to discuss 1) the impact on their area under the proposed project, and 2) alternative proposals for solar placement either in Fayette County or other areas closer to Clarksville.

close window

From:	Gary Bullwinkel
To:	Cates, Jacquelyn Taylor
Subject:	Fw: Fayette County TN - TVA Draft Environmental Assessment - Request for Public Presentation/Comment Session
Date:	Monday, October 7, 2019 5:08:40 PM

TVA External Message. Please use caution when opening.

You warned me! jtcates it is!

gb

----- Forwarded Message -----
From: Gary Bullwinkel [redacted]
To: jcates@tva.gov <jcates@tva.gov>
Sent: Monday, October 7, 2019, 03:26:24 PM CDT
Subject: Fw: Fayette County TN - TVA Draft Environmental Assessment - Request for Public Presentation/Comment Session

Ms. Cates:

Thank you for your time today on the phone. Am forwarding you the note I prepared for Senator Blackburn's office. Daniel is her legislative aide for energy/TVA issues.

Thank you and we appreciate TVA's attention to this matter of increased public participation on an important but controversial project in our district.

gb

----- Forwarded Message -----
From: Gary Bullwinkel [redacted]
To: [redacted]
Sent: Monday, October 7, 2019, 02:44:16 PM CDT
Subject: Fayette County TN - TVA Draft Environmental Assessment - Request for Public Presentation/Comment Session

Daniel:

Hello, my name is Gary Bullwinkel and I am a member of the Yum Yum Concerned Citizens, a local group of rural residential homeowners and landowners from the immediate and surrounding area of a proposed 4,003 acre (6.25 square miles) utility scale solar electric generating facility.

We would like Senator Blackburn's assistance and support in requesting a public presentation/public comment session to be held in Somerville, TN in regard to the Yum Yum Solar Project as described below. This project is an unprecedented huge solar facility placed in an rural residential zoned area and will take over 3,000 acres of prime and productive farmland out of production.

Some of the effects identified by TVA are the huge size and impact of this project on farmland acreage and the socioeconomics of the corresponding loss of agricultural production. The location of the facility next to a large rural minority neighborhood has raised questions about the lack of adequate direct notice of the project to these citizens and other rural residents next to and near the project.

We have questioned and opposed the precedence of allowing solar facilities to be arbitrarily placed in any rural area in Fayette County (and Tennessee) when the TN State 1101 Growth Plan law specifically forbids the placement of industrial sites in rural land use areas without going through a rigorous countywide process of analysis, public participation and multiple municipal public hearings and legislative bodies votes.

****
*** Our request *****
****

In the light of such a complex array of Federal, State, local and public concerns and issues, we think it would be a good and necessary action on TVA's part to hold one of their Public presentation/Public Comment hearing meetings in Somerville, TN, county seat of Fayette County.

We would also request that the Public Comment period be extended to 30-60 days to be able to schedule, give notice and hold such a meeting and allow the public who attend adequate time to give comments after such an informational meeting. The public comment period currently ends on October 16th, 2019.

We also request that TVA take the effort to provide direct notice to a larger group of people next to and near the site that would include all the local minority residents and other residents within 1-2 miles from the rural site that covers several square miles of land along several rural roads.

We appreciate our public representatives' interest in such public participation events and the need for governmental response to citizens' requests for such events. Please respond with your response to our request.

Thank you,
Gary Bullwinkel
[redacted]

TVA Contact

For more information about the environmental review contact:

J. Taylor Cates
NEPA Project Manager

jtcates@tva.gov
1101 Market Street, BR 2C-C
Chattanooga, TN 37402

TVA - Yum Yum Solar Project

TVA - Yum Yum Solar Project

" Under the terms of the conditional PPA, dated November 9, 2018, TVA would purchase the electric output from the solar facility for an initial term of 20 years, subject to satisfactory completion of all applicable environmental reviews. Together, the proposed Yum Yum Solar Energy Center and TVA's proposed switching station, TL connection, and PPA with Yum Yum Solar are herein referred to as the "Project" or the "Proposed Action."
The proposed Yum Yum Solar Energy Center would occupy portions of 25 individual tracts of
land, which in their entirety encompass nearly 4,003 contiguous acres in rural Fayette County,
Tennessee, southwest of the unincorporated community of Yum Yum. Invenergy secured land
rights from the owners of the individual tracts to construct the solar facility on their property. The portion of the 25 tracts proposed for solar development encompasses approximately 2,639 acres, . . ." - Description of Project from TVA EA - Yum Yum Solar Farm

From:	Matthew K. Taylor
To:	Cates, Jacquelyn Taylor
Cc:	Kendra Abkowitz
Subject:	TDEC Comments on TVA Yum Yum Solar Draft EA
Date:	Thursday, October 17, 2019 11:33:27 PM
Attachments:	image001.png 2019-10-17--TDEC_Comments_TVA_Yum_Yum_Solar_Draft_EA.PDF

TVA External Message. Please use caution when opening.

Dear Ms. Cates,

The Tennessee Department of Environment and Conservation (TDEC) appreciates the opportunity to provide comments on the Tennessee Valley Authority (TVA) *Draft Environmental Assessment* (EA) for construction and operation of a proposed solar facility, the Yum Yum Solar Energy Center, as well as actions taken by TVA to construct a new switching station and transmission line (TL) to connect the solar facility to the existing TVA transmission system in Fayette County, Tennessee. Please note that these comments are not indicative of approval or disapproval of the proposed action or its alternatives, nor should they be interpreted as an indication regarding future permitting decisions by TDEC. Please contact me should you have any questions regarding these comments.

Thanks,

Matt Taylor | Senior Policy Analyst
Office of Policy and Sustainable Practices, TDEC
William R. Snodgrass Tennessee Tower
312 Rosa L Parks Ave, 2nd Floor
Nashville, TN 37243
[redacted]

We value your feedback! Please complete our customer satisfaction survey.

STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
NASHVILLE, TENNESSEE 37243-0435

DAVID W. SALYERS, P.E.
COMMISSIONER

BILL LEE
GOVERNOR

October 17, 2019

Via Electronic Mail to jtcates@tva.gov
Attn: Taylor Cates, NEPA Specialist
Tennessee Valley Authority
1101 Market Street, BR2C-C
Chattanooga, TN 37402

Dear Ms. Cates:

The Tennessee Department of Environment and Conservation (TDEC) appreciates the opportunity to provide comments on the Tennessee Valley Authority (TVA) *Draft Environmental Assessment* (EA) for construction and operation of a proposed solar facility, the Yum Yum Solar Energy Center, as well as actions taken by TVA to construct a new switching station and transmission line (TL) to connect the solar facility to the existing TVA transmission system in Fayette County, Tennessee. The proposed Yum Yum Solar Energy Center would be constructed and operated by Yum Yum Solar and would have alternating current (AC) generating capacity of 147 megawatts (MW) and would occupy portions of 25 individual tracts of land, which in their entirety encompass nearly 4,003 contiguous acres of which approximately 2,639 are proposed for solar development.[1] In addition to purchasing the electric output under the power purchase agreement (PPA) with Yum Yum Solar, TVA would construct the proposed Yum Yum 161-kV Switching Station, and a 190-foot 161-kV TL would connect the new switching station to TVA's adjacent existing Cordova-South Jackson 161-kV TL.

Actions considered in detail within the Draft EA include:

- **No Action Alternative** – The No Action Alternative provides a baseline of conditions against which the impacts of the Proposed Action Alternative are measured. Under the No Action Alternative, TVA would not purchase the power generated by the Project under the 20-year PPA with Yum Yum Solar (i.e., TVA would not be involved with the Project), and Yum Yum Solar would not construct or operate the Yum Yum Solar Energy Center. Existing conditions (land use, natural resources, visual resources, physical resources, and socioeconomics) in the Project Area would remain unchanged. TVA would continue to rely on other sources of generation described in the 2019 Integrated Resource Plan to ensure an adequate energy supply and to meet its goals for increased renewable energy and low GHG-emitting generation.

[1] The Yum Yum Solar Energy Center would consist of a solar array containing crystalline silicon PV panels attached to ground mounted single-axis trackers, central inverters, several medium voltage transformers and one or two main power transformers (MPTs), internal site access roads, and all associated cabling and safety equipment. The MPTs would be located within a proposed Project substation and would connect to TVA's existing Cordova-South Jackson 161-kV TL via TVA's proposed Yum Yum 161-kV Switching Station and associated 190-foot TL connection.

- **Proposed Action Alternative –** Under the Proposed Action Alternative, Yum Yum Solar would construct and operate a 147-MW AC single-axis tracking photovoltaic (PV) solar power facility in Fayette County, Tennessee. The solar facility would generate approximately 191-MW DC output that would be converted to 147-MW AC output for transmission to the electrical network. The energy generated by the project would be sold to TVA in accordance with the terms of the PPA. The project would occupy approximately 2,639 acres of land located on 25 individual parcels immediately southwest of the Yum Yum community and would connect to the TVA electrical network via TVA's adjacent existing Cordova-South Jackson 161-kV TL. Under the Proposed Action, TVA would construct a new, 161-kV switching station northwest of the intersection of Wilson Road and Fowler Drive. A proposed 190-foot 161-kV TL would connect the new switching station to the Cordova-South Jackson 161-kV TL (L5190).

TDEC has reviewed the Draft EA and provides the following comments:

General Comments

The project is within the New Madrid Seismic Zone. According to the Catastrophic Earthquake Response Planning Project (2009), Fayette County is listed as a county that is anticipated to be impacted or severely impacted during a major seismic event.[2] This area is anticipated to experience increased soil amplification and liquefaction. TDEC recommends TVA consider soil amplification and liquefaction potential at the site to determine the risk from seismic activity. Additionally, TDEC recommends designing and constructing the Yum Yum Solar Energy Center such that it meets the most current earthquake readiness recommendations.[3]

Cultural and Natural Resources

TDEC believes the Draft EA adequately addresses potential impacts to cultural and natural resources within the proposed project area.[4]

Energy Resources

TDEC is supportive of resiliency efforts, including more decentralized power supply, in the state. In the event of an energy emergency, the site may provide an emergency source of electricity for critical infrastructure and facilities (e.g., hospitals, shelters, food banks) in the region. TDEC encourages TVA to consider constructing the Yum Yum Solar Energy Center as a microgrid to increase the State's energy security in and near the New Madrid Seismic Zone.

TDEC recommends that consideration be given to using electric-powered lawn equipment, which can be as much as fifty percent (50%) quieter than traditional gas-operated model. Electric-powered Lawn equipment has zero air emissions onsite, reduces petroleum-fuel purchases, and eliminates used oil waste.[5] Similarly, if there is an opportunity to use all-electric portable earthmoving equipment, it would result in reduced noise, air emissions,

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[2] For more information, please visit http://cusec.org/documents/scenarios/2009_Scenario_MAE_Center_Vol_I.pdf.
[3] Institute of Electrical and Electronics Engineers (IEEE). Recommended Practices for Seismic Design and Substations 10 April 2019, for more information visit https://ieeexplore.ieee.org/document/8686442.
[4] This is a state-level review only and cannot be substituted for a federal agency Section 106 review/response. Additionally, a court order from Chancery Court must be obtained prior to the removal of any human graves. If human remains are encountered or accidentally uncovered by earthmoving activities, all activity within the immediate area must cease. The county coroner or medical examiner, a local law enforcement agency, and the state archaeologist's office should be notified at once (Tennessee Code Annotated 11-6-107d).
[5] Lawn equipment could be charged on site with the energy generated.

petroleum-fuel purchases, and used oil waste. TDEC recommends TVA consider these additional details in the Final EA.

Finally, TDEC recommends that TVA consider addressing any potential Electro Magnetic Field (EMF) impacts that may result from the proposed action in the Final EA.[6]

Air Resources

TDEC recommends that should open burning be considered for disposal of wood wastes generated from the proposed project, alternatives to open burning, including chipping, composting or grinding of wood waste, be evaluated first. If open burning is selected for wood waste disposal TVA should consider implementing a smoke management plan, not burning on air quality alert days, and coordinating burning with other agencies (local and State air pollution control agencies, forestry agencies and local fire departments). TDEC encourages the Final EA to include discussion relating to these considerations.

TDEC understands that a number of old buildings and abandoned structures exist in the project area but it is unclear as to whether any of the structures would be required to be demolished or removed from the site. If any demolition activity is anticipated, an Asbestos Demolition or Renovation Notification should be provided as needed in advance of any demolition work.[7] TDEC encourages TVA to include discussion in the Final EA relating to the need to complete appropriate notification(s) in advance of any demolition activities as required under the state of Tennessee asbestos regulations and that if Regulated Asbestos-Containing Material is identified as present or likely to be encountered during the proposed project, that appropriate measures be taken to abate the asbestos as needed.

Some existing and new solar power generating facilities may use emergency engines (diesel, gasoline or natural gas/propane powered) to operate emergency electric generators on site. The Draft EA does not include a reference to this type of equipment. If emergency generators are to be installed on site they may be subject to permitting under TDEC's "Permit by Rule" regulations or may be small enough to qualify as an "insignificant activity" and not be subject to permitting.[8] TDEC encourages TVA to include discussion relating to this in the Final EA.

Solid Waste

TDEC recommends that any wastes associated with the proposed action or its alternatives be managed in accordance with the Solid and Hazardous Waste Rules and Regulations of the State of Tennessee.[9] TDEC recommends that the Final EA reference that any wastes that are generated during the construction process or uncovered during site preparation are subject to the Solid and Hazardous Waste Rules and Regulations of the State of Tennessee.

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[6] There is increased stakeholder awareness regarding possible EMF impact and utility scale solar projects. While consensus regarding effects in general, and more specifically, their magnitude, has yet to be reached, it may be in TVA's best interest to proactively address any concerns that Tennessee Valley customers may have.

[7] For more information on TDEC's Asbestos Demolition or Renovation Notification requirements, please visit https://www.tn.gov/environment/program-areas/apc-air-pollution-control-home/apc/asbestos-information/notification-of-asbestos-demolition-or-renovation.html.

[8] In either case, the facility owners or authorized representative would need to submit documentation to the Division of Air Pollution Control as needed for permitting or an exemption. For more information on TDEC Division of Air Pollution Control permitting, please visit https://www.tn.gov/environment/program-areas/apc-air-pollution-control-home/apc/permit-air-home.html.

[9] Reference TDEC SWM Rule 0400 Chapter 11 for Solid Waste and Chapter 12 for Hazardous Waste http://sos.tn.gov/effective-rules.

Water Resources

TDEC concurs with TVA that a Stormwater Construction General Permit (CGP) and Stormwater Pollution Prevention Plan (SWPPP) as well as an Aquatic Resource Alteration Permit (ARAP) based on the six streams that will be crossed. A hydrologic determination has already been performed and submitted to TDEC in association with this project. Additionally, the submittal indicates that the solar panel washing will be with water only and any herbicide use will be limited in scope and there will be 25 foot buffers around the streams.

The Draft EA indicates there will be a septic tank and well installed for the operational and maintenance building, which will likely require TDEC permitting. Full time staff for the building is expected to be 6 persons. If the septic system has the capacity to serve more than 20 persons, it will need to be permitted as a large capacity septic system. If the well will serve 25 or more persons more than 60 days per year, it will be considered a public water system and be regulated either as a transient non-community system or a non-transient non-community system.[10] TDEC encourages TVA to include additional information relating to the septic system and well in the Final EA.

TDEC appreciates the opportunity to comment on this Draft EA. Please note that these comments are not indicative of approval or disapproval of the proposed action or its alternatives, nor should they be interpreted as an indication regarding future permitting decisions by TDEC. Please contact me should you have any questions regarding these comments.

Sincerely,

Matthew Taylor
Senior Policy Analyst, Office of Policy and Sustainable Practices
Tennessee Department of Environment and Conservation

[redacted]

[redacted]

[10] A non-transient non-community water system is a non-community water system that regularly serves at least 25 of the same persons 60 or more days per year. A transient non-community water system serves at least twenty-five (25) different individuals daily at least sixty (60) days out of the year. For more information on TDEC Division of Water Resources permitting, please visit https://www.tn.gov/environment/permit-permits/water-permits.html.

From: Jody Campiche
To: Cates, Jacquelyn Taylor
Subject: Request of TVA Public Hearing for Yum Yum Solar Environmental Assessment
Date: Thursday, October 17, 2019 10:16:45 AM

TVA External Message. Please use caution when opening.

I would like to submit a request for TVA to hold a public hearing in Fayette County to discuss the Environmental Assessment for the Yum Yum Solar Project. I would also like to request an extension of the public comment period to allow citizens to attend the public hearing prior to submitting comments.

My property adjoins the proposed Yum Yum solar project and I have many questions and concerns. Many of the components of the TVA Environmental Assessment have not been addressed in previous meetings. This is one of the largest solar projects in the country and TVA should provide an opportunity for the community to discuss the Environmental Assessment.

Jody Campiche
[redacted]

From: retha leblanc
To: Cates, Jacquelyn Taylor
Subject: Yum Yum Solar project
Date: Monday, October 14, 2019 9:41:09 PM

TVA External Message. Please use caution when opening.

I am writing to express my serious concern about this project. When I was in the Navy, my unit generated just one megawatt of power. We stuck a fluorescent bulb into the soil, on its end, and it illuminated. We had warning signs not to leave the roadway or stop in the area. If that much electromagnetic radiation was produced with one megawatt, what kind of a field will 147 megawatts produce? What effects will this have on the humans living in this area? No amount of easement, fencing, or foliage will protect against that. We already know that the soil and wildlife will be affected, but what about the long term effects on humans? Have any studies been conducted concerning us? Why should we be the guinea pigs? If TVA participates in this project, will you be partially liable for the consequences? I think the size of this project warrants more study on the effect on humans.

Thank you for your consideration in this matter.

Sincerely,
Retha LeBlanc, [redacted]

Sent from my iPhone

From: donald graves
To: Cates, Jacquelyn Taylor
Subject: Yum Yum Solar Project
Date: Thursday, October 17, 2019 8:25:27 AM

TVA External Message. Please use caution when opening.

I would like to request a public presentation be held in Fayette County by TVA concerning the Environmental Assessment for the Yum Yum Solar Project. Also, please extend the period for public comments to a date after the public presentation in Fayette County.

I am concerned, frankly appalled, that such a huge project which affects so many acres of prime farmland in Fayette County is being fast-tracked through TVA. Being a life-long Fayette County resident and from a third generation farm family in the county, the idea of taking extremely productive agricultural land out of production in order to construct a solar farm, from which energy generated will not benefit the residents of the area, is very problematic to me.

A public hearing by TVA for the many concerned citizens in the county doesn't seem to be too much to ask.

Diane Graves
[redacted]