gai consultants

Madison Cave Isopod (*Antrolana lira*) Low-Effect Habitat Conservation Plan

Warren County Power Station Project
Warren County, Virginia

Project C110155.00
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EXECUTIVE SUMMARY

Virginia Electric and Power Company, DBA Dominion Virginia Power (DVP) is proposing the construction of a new power station facility located in Warren County, Virginia (VA) known as the Warren County Power Station (Project). The Project is located on an approximately 39-acre parcel underlain by known karst formations. The Madison Cave Isopod, *Antrolana lira* (MCI) is listed as a threatened species under the United States Endangered Species Act (US ESA), 16 U.S.C. §§ 1531 *et seq.*, and the VA Endangered Species Act (VA ESA), Va. Code §§ 29.1-563 *et seq*. The MCI is known to inhabit karst formations. Although MCI presence has not been confirmed in the karst formation beneath the Project site, the species does occur 0.2 miles away. Therefore, for the purpose of incidental take coverage under the US ESA, the karst formations beneath the Project site could be potential habitat for an MCI population.

DVP is submitting this proposed Low-Effect Habitat Conservation Plan (LEHCP) to the United States Fish and Wildlife Service (FWS), as part of its application for an Incidental Take Permit (ITP) under Section 10 of the US ESA. The LEHCP examines the extent of the anticipated MCI take, includes avoidance, minimization and mitigation measures, and identifies measures and funding to implement these conservation commitments. DVP is requesting an ITP to impact up to 2,897 ft^2 (which includes up to 2,234 piles and 13 caissons) of potential MCI subterranean habitat during construction. DVP further requests that the ITP be active from issuance of the permit through January 1, 2020 and covers construction activities, including aquifer recharge and foundation design. DVP will also enter into an implementing agreement to ensure maintenance of the stormwater system for the life of the facility. The ITP is intended to cover the entire 39 acres of the Project site.

The LEHCP relies on a robust avoidance and minimization plan and then includes mitigation focused on protecting key high quality habitat that encompasses a known MCI population in close vicinity to the Project. The conservation strategy is designed to be consistent with the Recovery Plan for the species (FWS, 1996) and other additional recommendations for the management of the species. This LEHCP quantifies the function of the habitat potentially affected by the proposed Project and the proposed mitigation package to confirm it will result in an equal or better condition for the MCI as a result of the Project.

Potential changes such as the listing of a new species, change in the listing status of the MCI, or change in the proposed mitigation are addressed through adaptive management and changed circumstances in the LEHCP.

1.0 INTRODUCTION AND BACKGROUND

1.1 Overview/Background

The Project will consist of a natural gas-fired combined-cycle plant utilizing three combustion turbines, three heat recovery steam generators and one steam turbine generator. The Project will supply a need for new generating capacity and energy that is clear and immediate, and it will do so at reasonable cost levels, not only with regard to its construction but also as it operates over its 36-year projected service life. The need for this plant to enter service by 2015 was identified in DVP's 2009 and 2010 Integrated Resource Plans as a key element towards meeting additional capacity and energy requirements in DVP's service territory. The Project will ensure a reliable and adequate supply of electricity at a reasonable cost to meet DVP's projected native load obligations. The Project is the optimal and logical next new generation project for DVP to undertake in fulfilling those commitments. The Project will have state-of-the-art technology, economies of scale and provide an efficient, reliable, reasonable

cost facility with an outstanding heat rate and low emissions. In addition, the Project is beneficially located in close proximity to high load growth areas and needed infrastructure. The Project has very favorable projected long-term customer savings and substantial anticipated economic benefits. The Project, as proposed, is anticipated to be one of the most efficient power plants in the nation once operational.

DVP is requesting the desired term of the ITP to cover the construction of the described facility from issuance of the ITP through January 1, 2020. This is proposed to cover the length of construction at the Project site and five years of post construction monitoring. The monitoring is to commence in the spring of 2011 to record baseline data prior to construction, proceed through the duration of construction activities and conclude on January 1, 2020, five years after the projected end of the construction. DVP further requests that the ITP cover the entire 39 acres for the covered activities and level of affects as described in this LEHCP. Project operations at the site are not anticipated to impact the MCI or their habitat therefore project operations will not be included in the ITP.

1.2 Plan Area

The Project is located in Warren County, VA, approximately three miles north of the Town of Front Royal in the Warren Industrial Park located on Kelly Drive (Figure 1). The size of the Project site is approximately 39 acres. Neighboring parcels are a mix of industrial and forested areas, with large sections of cleared land and structures for industrial use immediately adjacent to the Project site. The Project's topography is relatively flat, and gently slopes to the southeast where a railroad track berm delineates the eastern boundary. An existing, paved road bisects the site into western and eastern sections. The western section is a mix of open, scrub-shrub and early successional forest with a small sediment detention pond located in the southwestern corner. The majority of the eastern section consists of scrub-shrub with some smaller forested areas. Figure 2 depicts the pre-construction (existing) site conditions with respect to surface cover. Site photographs documenting the pre-construction site conditions are provided in the Photographs section of this plan.

1.3 Species to be Covered by Permit

The MCI is a freshwater crustacean that inhabits subterranean, deep karst aquifers. It is the only freshwater, cirolanid isopod found north of Texas and is endemic to phreatic zones of aquifers located in the Shenandoah Valley of VA and West Virginia (WV). The phreatic zone is the zone of saturation directly beneath the water table where pore space is completely filled by water. It is believed that the species has a low reproduction potential and long lifespan, inhabits karst areas where groundwater is saturated with calcium carbonates, and it is carnivorous, feeding on 1) other aquifer species depending on surface connections, 2) animals that enter the karst aquifers through surface connections (FWS, 1996), or 3) other opportunistic scavenging.

The MCI was listed as a threatened species under the US ESA and VA ESA in 1982. There is no listed critical habitat for the MCI at this time. The species was first thought to inhabit only two locations in Augusta County, VA, the Madison Saltpetre Cave and Steger's Fissure. As of 2007, it has been found in 19 locations consisting of caves, fissures, and wells that have connections to the phreatic zone of karst aquifers and ranges from Jefferson County, WV, to Rockbridge County, VA (Orndorff and Hobson, 2007).

A recent study on the genetic structure of nine populations located throughout most of the species range suggests significant genetic variation among populations. Populations belong to one of three distinct geographic groups. Within a geographic group, populations are genetically similar to one another indicating that animals can actively migrate and interbreed between

populations. The three geographic groups are found in different regions of the Shenandoah Valley and have been isolated from one another for several million years, but they do not constitute separate species. Populations within a geographic group are spatially near one another but are separated from other geographic groups by physical distance and/or potential geological barriers (Hutchins et al, 2007). The northern geographic group consists of five sites located in Warren County, VA and Jefferson County, WV. Two sites, Brother Dave's Cave and Power Plant pit, lie within the northern geographic group and are located approximately 0.2 miles from the Project site (Figure 1).

2.0 ENVIRONMENTAL SETTING/BIOLOGICAL RESOURCES

2.1 Environmental Setting

2.1.1 Climate

The Project site is located approximately three miles north of the town of Front Royal in the northern Shenandoah Valley region of VA. This region typically experiences hot, dry summers and cool, wet winters. The Front Royal area averages 30 to 40 inches (in) of precipitation per year.

2.1.2 Topography/Geology

The Project site is located in the foothills of the Blue Ridge Mountains physiographic area. The property is gently rolling and generally slopes to the southeast towards karst features and the Shenandoah River, located approximately 2,000 feet (ft) to the south.

The geologic profile of the site consists of two different formations from the Ordovician age. The Beekmantown Group, Rockdale Run Formation composed primarily of dolostone and limestone, is located in the eastern section of the Project site and the Edinburg Formation, Lincolnshire Formation, and New Market Limestone are located in the western section and consist mainly of limestone and dolomitic rock (Rader and Briggs, 1975). Limestone and dolomitic rock are carbonate rocks that are susceptible to solution erosion and weathering from acidic surface waters. This process is known as Karstification and may cause the formation of subsurface voids, caves, channels, vertical shafts, and other cavities where the underlying rock formation has been eroded. Surficial expressions of karst features include closed depressions (sinkholes), disappearing streams, springs, and rock outcroppings with apertures (Palmer, 2007). Geologic investigations were conducted on the Project site and found voids and other solution features within the subsurface strata. Features were primarily found in limestone and dolostone rock units. Rock on site ranges from outcroppings located on the ground surface to approximately 35 feet below the ground surface (Schnabel, 2007).

2.1.3 Hydrology/Stream, Rivers, Drainages

Site hydrology is dominated by two stormwater dry detention basins that were constructed to treat post-development runoff and release the flow at the pre-development rate for the two and 10-year storms. These existing basins, as designed, mitigated the increased stormwater runoff peak rates of potential industrial development but provided only minimal water quality control. The southern detention pond currently collects turbid sediment-laden (muddy) water that is eventually directed to the aquifer through an off-site sinkhole. This action is effectively introducing sedimentation (total suspended solids), surface derived organic pollutants (Phosphorus and Nitrogen), and other contaminants into MCI habitat. Estimates for Phosphorus removal in the currently designed system is 20 percent. These basins essentially capture all the water not infiltrated on site. A photograph of the pond along the southern portion

of the pre-construction site is shown in Photographs 1 and 2. No other streams, rivers, or drainages are located on the property.

Groundwater levels at the site vary from approximately seven to 44 feet below surface elevation with the highest level existing in the northwestern portion of the site. Stabilized groundwater elevations varied from seven feet above to four feet below the rock surface (Schnabel, 2011). Groundwater levels that were recorded closer to the surface appear to constitute a perched water table where MCI populations are not anticipated to dwell. Potential MCI populations may be located in the phreatic zone, which is located below the perched water table.

2.1.4 Vegetation

Existing vegetation includes some scrub-shrub grassland/open land and mixed deciduous and coniferous trees. Photographs of the site depicting existing vegetation types are shown in Photographs 3 through 6. The existing land cover (from 2008 aerial photography) is presented in Figure 2, while the proposed post-construction land cover is presented in Figure 4.

2.1.5 Wildlife

The proposed construction footprint at the Project site is located on land that has been previously disturbed. A mix of grass, scrub-shrub, and successional forests have developed following site disturbance. As a result, current wildlife utilization of the property is anticipated to be minimal. The surrounding land use is characterized primarily as industrial, although a County-owned park property is located to the east of the site across an existing railroad line. Wildlife present in the area would most likely be tolerant of a moderate level of human activity.

Wildlife expected to occur in the vicinity of the Project site includes white-tailed deer, turkey, red fox, groundhog, mice, voles and other small mammals. Songbirds, hawks, and owls are expected to use adjacent wooded areas. Aquatic species are not present on the surface of the property due to the lack of any permanent waterbodies.

2.1.6 Existing Land Use

The existing land use consists of a site zoned for industrial use and is presently unoccupied. The property is located in an existing industrial park that includes several structures/facilities adjacent to and/or in the general vicinity of the Project site. The property had been previously disturbed and successional vegetation is re-establishing across the site. When DVP acquired the property, it consisted of eight individual lots. DVP obtained approval from Warren County to consolidate the eight lots into two lots.

2.2 Species of Concern in the Plan Area

2.2.1 Wildlife Species of Concern

The LEHCP is intended for the MCI, listed as threatened under the US ESA and the VA ESA. Additional information regarding this species is provided in Section 1.3.

2.2.2 Other Listed Species

Based on Project consultation with the federal and state resource agencies, there are no other US ESA or VA ESA listed species on or in the immediate vicinity of the Project site. No additional consultation is required for species other than the MCI.

3.0 PROJECT DESCRIPTION/ACTIVITIES COVERED BY PERMIT

3.1 Project Description

DVP began development of the Project after acquiring the site from CPV Warren, LLC ("CPV Warren") in February of 2008. CPV Warren planned to develop the site as a 2x1 combined-cycle facility (2 combustion turbines with exhaust heat recovery units to power a steam turbine), and had obtained a certificate of public convenience and necessity from the State Corporation Commission (Case Nos. PUE-2002-00075 and PUE-2007-00018), as well as other required permits and approvals. Since then, DVP has obtained a Prevention of Significant Deterioration Permit (the "PSD Permit") for the Project from the VA Department of Environmental Quality ("DEQ") and a Warren County Conditional Use Permit for the facility to accommodate a 3x1 combined-cycle design (3 combustion turbines with heat recovery units to power a steam turbine). Water supply and gas transmission agreements have been secured. The construction period is estimated to last 30 months, with a projected in-service date in December 2014 in order to meet the 2015 identified need for this Project.

A key component in the selection of the site and technology was the ability to minimize overall environmental impacts. This site was chosen and the plant conceptually designed to avoid impacts to the land, water, and air resources of the area and surrounding region, to the greatest extent practicable. The goal of reducing the overall environmental impact of the Project has been given a high priority throughout the preliminary design.

The Project will consist of a natural gas-fired combined-cycle plant utilizing three combustion turbines, three heat recovery steam generators and one steam turbine generator, hence the industry designation of "3x1 combined-cycle". Combined-cycle units of the 3x1 configuration are currently in-service both domestically and throughout the world.

<u>Power Station</u>

The Project will have a net capacity of approximately 1,329 MW (nominal) and a heat rate (efficiency) of approximately 6,805 Btu/kWh when operating with duct burners. The Project's heat rate will be among the best in the nation when it enters service and will serve to reduce fuel usage and lower costs as well as emissions rates. The combustion turbines that DVP has purchased for the Project are the largest air-cooled turbines currently available, and they have proven field experience. The use of air-cooled condensers for the steam generating system will also result in a greatly decreased water usage at the facility as compared with a wet cooling design. The facility is anticipated to use less than 10 percent of the water that would be required for a wet cooling system. The Project, as proposed, is anticipated to be one of the most efficient power plants in the nation once operational and will consist of a relatively small footprint on the proposed site with respect to the overall size of the anticipated output.

<u>Utilities</u>

The Project will interconnect with an existing DVP 500kV transmission line traversing the site which eliminates the need for the installation of additional transmission lines to support the Project. The plant's natural gas supply will be delivered through an approximately three-mile gas pipeline to be developed and constructed by Columbia Gas Transmission, LLC.

Water for the Project will be supplied by the Town of Front Royal (Town). No groundwater withdrawal is proposed for the Project, which will further avoid and minimize potential impacts to the phreatic zone beneath the site. The Town is authorized under an existing Virginia Water Protection permit to withdraw from the Shenandoah River and supply the water necessary to meet the Project's needs, while preserving water resources and protecting the environment.

The Project is designed to reuse water but sanitary and industrial waste will be discharged to the Town of Front Royal's sewage system under an Industrial User Permit. The Town currently operates a wastewater treatment plant under a Virginia Pollutant Discharge Elimination System (VPDES) permit.

Site Preparation

Prior to any foundation construction, DVP will perform site preparation during 2011. These activities will include clearing the site of vegetation, relocation of underground utilities, reverse grading sinkholes, leveling the site and stabilizing the surface to prevent erosion. Land cover currently consisting of scrub-shrub and early successional forest will be converted to areas of gravel and grass. Two existing dry stormwater ponds will be expanded and enhanced to wet ponds and one additional wet pond will be constructed to further improve the stormwater system at the site.

A number of mantled sinkholes are currently located across the site that allow for the infiltration of water and nutrients into the flooded voids beneath the property. As the site is graded to accommodate the new facilities, the identified sinkhole features will be reverse graded according to Virginia Department of Conservation and Recreation (DCR) guidance for construction in karst terrain (Figure 3).The reverse grading will preserve the function of the sinkholes to allow for the continued infiltration of organic matter and water into the voids while providing the long term structural strength needed to support the Project infrastructure.

Site Construction

Construction of the Project is scheduled to begin in 2012. This shall include the construction of the turbines, cooling tower, offices, and related infrastructure necessary for operation of the plant. Development of the 39-acre parcel will result in approximately 6.8 acres of impervious surface consisting of paved areas and structures. As part of facility construction, driven piles and caissons will also be installed to support the foundation. The installation of foundations is discussed further in Section 3.2.

Stormwater Management/Aquifer recharge

Following construction, there will be minor changes in the surface water infiltration pathways on the Project site and an increase in the impervious layer from 0.7 acres to 6.8 acres. DVP has developed a plan to control the discharge of stormwater while improving upon the current site condition by providing a design that will control stormwater quality as well as quantity prior to off-site discharge. The system will consist of catch basins, a subsurface culvert system, drainage swales, and three on-site stormwater management ponds (SWMPs). DVP will follow all state stormwater management regulations in the upkeep and maintenance of their SWMPs.

Current site conditions include the two stormwater basins as described in Section 2.1.3. For the Project, the existing detention basins will be enlarged and become SWMP #1 and #2. Two wet ponds (SWMP #1 and SWMP #3) will be located at the south end of the site, connected in series, and will receive runoff from a majority of the Project site. SWMP #1, as designed, is to be located in the general vicinity of an existing southern detention pond. The runoff with the highest probability of containing hydrocarbons will drain to SWMP #3, which is sited for easy access and maintenance and its size will make cleanup easier to complete. A third smaller pond (SWMP #2) will capture runoff from the remainder of the site which includes a paved area used to support warehouse loading and unloading activities, the switchyard and the chiller enclosures. SWMP #1 and SWMP #3 have been over-designed to hold/treat a 100 year 24-

hour storm event while SWMP #2 has been sized to hold/treat a standard 10-year 24-hour storm event. Any flows exceeding the design capacity of either pond will flow over an emergency spillway and into the normal drainage way for the pond. In the case of SWMP #1 and #3 discharges from the control structure or the spill way will flow overland to a sink hole located to the southeast of the project site, next to the railroad tracks while discharges from the control structure or the spillway from SWMP #2 will travel overland to a drop inlet which enters into the county stormwater system. This design will more effectively capture and remove sediment from the collected stormwater prior to discharge into the aquifer than the current detention basins and thus improve the quality of water being directed to MCI habitat. Water and organic matter beneficial to MCI populations will still be able to reach the aquifer as part of this design. SWMP #1 is designed to reach 65 percent Phosphorus removal and SWMP #2 is designed to reach 40 percent Phosphorus removal. Both ponds essentially capture all the water not infiltrated on site.

All detention ponds are to be lined with impermeable clay liners and be equipped with hydrocarbon detectors and a standpipe with a manual shut-off valve that can be closed should stormwater be exposed to hazardous materials. Petroleum Hydrocarbon detectors will have a detection capability of 10mg/l or less. The manual shut off valve will be closed if the detectors reach 10 mg/l. Prior to discharge into the ponds, stormwater from parking areas and containment structures will be routed through oil/water separators.

Oil or potentially hazardous material on the site will be under roof or protected with lined individual containment structures with shut-off valves and trapped water will be visually inspected before release. If a sheen is noticed, absorbent pads will be deployed until the sheen is no longer visible. Individual containment structures will be designed to hold 110 percent of the full capacity of each tank within each containment structure.

3.2 Activities Covered by Permit

The two components of the Project that have potential to adversely affect MCI and their habitat during construction of the project are the foundation design for the Project site and alteration of aquifer recharge. Each of these components is explained below. It is requested that the ITP be active from issuance of the permit through January 1, 2020 in order to support these activities. The ITP is to cover the entire 39 acres of the Project site. No other construction activities or operation activities are anticipated to result in impacts to known MCI populations or other protected species.

Foundation Design

During power plant construction a variety of infrastructure will be constructed at the site, including buildings, roads, and storage facilities. As discussed in Sections 2.0 and 3.0, the proposed Project is located in an area of karst topography, which is susceptible to sinkholes or differential settlement. DVP will need to install drilled micropiles or driven H-piles to support heavier or critical structures. For the purpose of this LEHCP, the word “pile” is used to represent micropiles, H-piles and other piles that may be used for this project. It is anticipated that up to 2,031 piles will need to be installed across the project. A contingency of 10 percent is being added to the total number of piles and caissons to account for changes in design during construction based on actual conditions encountered. By adding this contingency, DVP is assuming a total of up to 2,234 piles and 13 caissons may impact the subterranean karst features beneath the Project site. Spread footings and mats can be used to support structures that are less critical or more tolerant to these geologic conditions (Schnabel, 2007). Following installation of the foundation, the power plant facility will be constructed.

In addition, DVP will be installing 13 caissons to support a series of transmission line towers across the site. While approximately 1,100 feet of conductive wire will be deployed to connect the generation station with the adjacent 500kv transmission line, the conductors and associated poles are not expected to impact migratory birds. Due to the high voltages involved, the distance between conductors will far exceed the clearance of 60 inches recommended to prevent electrocution in the *Avian Protection Plan Guidelines* produced by the Avian Power Line Interaction Committee and the FWS. The Project will also be in compliance with lighting restrictions in the Warren County Conditional Use Permit, which by limiting fugitive light and requiring full shielding of exterior lights will reduce the night time attraction of migtratory birds.

Alteration of aquifer recharge

Due to infrastructure construction (e.g., buildings, roads, and storage facilities) there will be a net increase in impervious surfaces at the Project site. DVP is anticipating that 6.1 acres will be converted from forest and partially forested cover to pavement and structures. This will be in addition to the 0.71 acres that currently exist as impervious surfaces. Therefore, the Project site will result in approximately 6.81 acres of impervious surfaces. In developing the site design, DVP worked diligently to minimize the footprint of the impervious surfaces at the Project site so as to minimize the potential impacts to MCI. There will remain over 32 acres in the Project site that are free of impervious surfaces.

4.0 POTENTIAL BIOLOGICAL IMPACTS/TAKE ASSESSMENT

4.1 Potential Direct and Indirect Impacts

The following provides a description of the potential direct and indirect impacts to MCI populations that may occur during construction activities. Three potential impacts are recognized: 1) rocks falling into flooded voids during drilling or driving, and drill bit or pile point making direct contact with MCI; 2) the introduction of sediment into flooded voids during drilling/driving into the phreatic zone during construction; and 3) loss of subterranean habitat due to installation of piles and caissons. Together, these potential impacts may rise to the level of take in the form of harm, harassment, or direct mortality of MCI and may also result in the loss of MCI habitat. Another potential impact from the project is from changes in the surface water and nutrient infiltration pathway due to additional impervious surfaces (described as impacts to aquifer recharge above). However, the impact to aquifer recharge has been addressed in the site design by a robust storm water treatment system such that take of MCI is avoided.

Geotechnical investigations concluded that most of the voids found within the Project site are within the rock stratum and at an elevation below the groundwater level. Though there is limited data on the ecological requirements of the MCI, they are known to inhabit voids within deep karst aquifers. Due to the voids in the Project site being inundated with groundwater and the Project's close proximity to known populations, these voids are potentially habitat for the MCI. Local geology and hydraulic gradients suggest that these water filled voids are actually within the epikarst and vadose zone above the phreatic zone and are, therefore, not primary habitat for the MCI (Orndorff, pers. comm.). Nevertheless, these voids will be treated as potential habitat to be conservative in the protection of the MCI.

Structures that could possibly be affected by sinkholes and karst topography will likely require the use of piles for their support. Installation of piles involves the use of a percussion hammer (air drill) to drill into rock, and air is then used to jettison spoils. A casing which is inserted as the drilling progresses is bedded into solid rock and filled with concrete. The piles will extend a minimum of 10 feet into competent bedrock to develop adequate side friction (Schnabel, 2007).

Consequently, the depth of individual piles will vary depending on the specific rock characteristics at each pile site. Diameters of piles used at these structures will most likely be seven inches (0.27 ft^2) and spacing will typically be either one pile per 36 ft^2 (six-feet spacing) or one pile per 64 ft^2 (eight-feet spacing)(Schnabel, 2011). However, for purposes of the LEHCP DVP has assumed that each pile will disturb approximately 1 ft^2 of void space due to the potential for spalling and sedimentation immediately surrounding each pile. Total area of void space that would be occupied by piles was calculated using the percentage of foundation with voids above the micropile bond zone, derived from the number of borings within the foundation that encountered voids against the total number of borings. When the spacing of the piles is then accounted for, approximately 2,234 ft^2 would be occupied by piles penetrating through flooded voids. If driven H-piles are used, this area of occupation would be substantially smaller.

Because concrete is poured within the casing, DVP does not anticipate harm to MCIs resulting from contamination or conduit obstruction from concrete. H-piles are driven to refusal based on side friction and strength of bearing material and are not reliant on any specific depth of competent rock.

The drilling technique to be utilized is anticipated to bring the majority of the sediment to the surface but localized spalling and sedimentation may occur immediately surrounding the boring during placement of each pile.

Drilling may harm, hurt, or harass potential MCI by breaking off rocks and hitting or impinging the MCI. Localized spalling, sedimentation, or drill vibrations may temporarily make the habitat unsuitable and cause the MCI to leave the area. The introduction of the piles into their habitat will alter their travel corridors and force them to take alternative pathways.

Approximately 13 caissons will need to be advanced to support a series of transmission line towers across the site. Caissons will be installed using a large diameter drill to bore the required hole, which will most likely be 8 feet in diameter. A steel casing will then be installed in the hole that will be filled with concrete. Caissons would account for approximately 654 ft^2 of surface. It is not expected that caissons will intersect groundwater, as they will not be placed in areas of known sinkholes. Therefore, DVP does not expect the caissons to be an influence on the potential take of the MCI. Again, to be conservative in the approach to protect the species, DVP has directed this LEHCP as if the caissons may intersect groundwater. It is not known at this time how deep the caissons will be advanced to hit solid rock as it is expected to vary at each location. Table 1 summarizes the use of piles and caissons relative to the potential encroachment to the karst setting.

A number of factors serve to minimize the potential impacts of the project to MCI. While it is assumed that affected karst habitat may impact MCI, there will remain a significant amount of unaffected subterranean habitat outside the areas where piles and caissons are to be installed. Therefore, individual MCI that occupy the phreatic zone beneath the Project site will still have numerous travel corridors within this subterranean habitat despite the introduction of the piles and caissons. In addition, during installation of piles it is likely that MCI will detect vibrations from the drill activity and may temporarily move away from the voids that are being affected. Thus, potential MCI may be less exposed to direct impacts than are otherwise anticipated.

4.2 Anticipated Take of MCI

Construction of the project may have several potential impacts that together rise to the level of take in the form of harm, harassment, or direct mortality of MCI and may also result in the loss of MCI habitat. There is no methodology currently available to determine when direct take of MCI has occurred or when take limits have been exceeded. In addition, while a model has been

developed to predict the potential impacts of take on the MCI population, the model assumptions and uncertainties reduce its utility for quantifying or measuring take of MCI at the project site. Therefore, DVP is using the amount of MCI habitat potentially affected by the project as a surrogate for direct and indirect take of MCI.

DVP has estimated the potential MCI subterranean habitat encroachment, in terms of area of karst surface intersected and/or affected by piles and caisson installation, as 2,897 ft^2 (0.07 acres). This level of take represents the maximum area where MCI would be exposed to the potential for direct impacts from impingement from falling rocks or contact with the drill bit or pile point, indirect effects from sediment introduced into flooded voids during drilling/driving into the phreatic zone during construction (assumed to disturb an area of one square foot around piles), and accounts for the loss of subterranean habitat due to installation of up to 2,234 piles and 13 caissons.

4.3 Potential Impacts to the MCI Population

To understand how the Project may impact MCI population levels, DVP modeled the number of MCI that could be potentially affected by the project. It should be noted that the model is significantly influenced by the assumed MCI density. There is currently no data available on MCI density at the Project site or reliable population density information within the known MCI population distribution. Therefore, for the model DVP used the density estimates for a similar isopod species, *Cirolanides texensis,* that occurs in Texas.

The equation used to estimate the number of MCI potentially affected is provided as Eq 1.

Estimated # of MCI Potentially Affected= (Piles + Caissons) x Karst Habitat x Isopod Density x Avoidance (1)

Where

Piles = the total number of piles on site (2,234) multiplied by the area of influence for ground disturbance for each pile, which is estimated to be 1 ft^2. Based on available data only 446 are estimated to intersect karst features, but all the proposed piles have been included to establish an estimate that maximizes potential take. Accordingly, it is estimated that all piles and caissons intersect karst features.

Caissons = the total number of caissons on site (13) multiplied by the area of influence for ground disturbance for each caisson, which is estimated to be 51 ft^2.

Karst Habitat = the probability of the pile or caisson being positioned over and drilled into karst terrain intersecting suitable habitat for the MCI. This value (60%) is taken from Hutchins and Orndorff (2009), and represents the probability of water wells intersecting habitat in which MCI was actually present (calculated from repeated sampling in Jefferson Co., WV).

Isopod Density = the approximated density of the MCI on site based on sampling of discharged *C. texensis* isopods from a well in a phreatic karst aquifer located in Texas. These two isopod species are very similar in characteristics of mobility, size, and taxonomy. The well, which is approximately 1 ft in diameter, discharges *C. texensis* isopods at the surface. Well dimensions and discharge rate (gpm) were used to calculate the average purging time for the well (the amount of time required to discharge one well volume of water). The average number of *C. texensis* discharge per well volume was used to estimate the average density of isopods per ft^2 in this environment. This approximation was used as

a surrogate for the density of the MCI on site. Based on this sampling, the density is estimated to be 0.02 MCI/ft^2.

Avoidance = the ability of the MCI to avoid direct impact by rock fall or drill bit impingement. DVP hypothesized that 50% to 75% of the time the MCI will be able to detect the advancing impingement and move to avoid it.

Using Eq. 1 and the values given for above, the following estimate for avoidance was obtained = 50 % (Eq 2.) and avoidance = 75 % (Eq. 3).

Estimated # of MCI Potentially Affected (50 % avoidance) = ((2,234 x 1 ft^2) + (13 x 51 ft^2)) x 0.6 x 0.02 MCI/ ft^2x 0.5 (2)

Estimated # of MCI Potentially Affected (50 % avoidance) = 17.4 MCIs or rounded up to 18 MCIs

Estimated # of MCI Potentially Affected (75 % avoidance) = ((2,234 x 1 ft^2) + (13 x 51 ft^2)) x 0.6 x 0.02 MCI/ ft^2x 0.25 (3)

Estimated # of MCI Potentially Affected (75 % avoidance) = 8.7 MCIs or rounded to 9 MCIs

Based on these parameters it is estimated that up to 18 individual MCIs could be potentially affected by this project.

Using the same density value (0.02 MCI/ ft^2) and total area of the Project site (39 acres), and assuming the entire Project site is underlain by suitable karst habitat for the MCI, it is estimated that 33,977 MCIs are under the site. If the subterranean habitat contains 33,977 MCIs, then the estimated 18 isopods that may be potentially affected by the level of take anticipated in this project is 0.05 percent of the MCIs occurring at the Project site. In reality, the estimate of 33,977 MCIs is probably too high by several orders of magnitude. It is based on *C. texensis* densities from a site in TX that has habitat with higher effective porosity (more habitat) and more abundant food sources. The highest number of MCI documented from a sampling site is "several hundred" (Orndorff and Hobson, 2007). Therefore, the modeled estimates of population size and by extension, the number of potentially affected MCI, are likely greatly overestimated. However, it is illustrative that the potential affect is likely a small proportion that may occur under the Project site estimate as a whole.

Data from nearby known MCI sites, Brother Dave's Cave and Power Plant Pit, 0.2 miles away from the project site indicate lower population levels. Seventeen MCIs were recorded in 2002 and one in 2006 from Brother Dave's Cave. In 2002 and 2006 five and "several observed" were reported from Power Plant Pit (Orndorff and Hobson, 2007).

In addition, researchers have estimated MCI population density from three locations, Madison Cave and Steger's' Fissure, VA, and King Irving Well, WV. The nearest population estimate for the MCI is King Irving Well, approximately 21 miles away. King Irving Well, Brother Dave's Cave, and Power Plant Pit are sites within the northern genetic haplotype group. Therefore it can be assumed that at one point in time there was connectivity between the sites and there may still be connectivity. Estimates from these sites were: Madison Cave - 360-1,020 individuals; Stegar's Fissure - 2,240-3,420 individuals; and King Irving Well - 112±110 individuals. These estimates were based on repeated sampling over the span of many days. These estimates do not approach the MCI levels estimated by modeling *C. texensis*, which further underscores the idea that the estimate of 33,977 MCI under the Project site is likely high and further supports the utility of using habitat as a surrogate for take.

5.0 CONSERVATION STRATEGY/MEASURES TO AVOID, MINIMIZE, AND MITIGATE FOR POTENTIAL IMPACTS

5.1 Biological Goals and Objectives

The biological goals and objectives of this LEHCP include the following:

1. Provide improved surface water quality to the phreatic zone beneath the Project site where MCI individuals may be present; and
2. Protect key habitat for a known MCI population(s).

5.2 Measures to Avoid and Minimize Potential Impacts

DVP has incorporated a number of measures to avoid and minimize potential impacts of the construction activities to the MCI and their habitat.

The site layout has been designed to minimize the amount of impervious surfaces to reduce aquifer recharge impacts. It is important to note that when DVP acquired the property, it consisted of eight individual lots. DVP obtained approval from Warren County to consolidate the eight lots into two lots (Lots 1 and 3 of the Warren Industrial Park). The Project, as designed, will occupy portions of both of these lots. Lot 3 will include the majority of the facility while a substation and overhead lines will be constructed on Lot 1. The portion of Lot 1 that will not be used as part of the substation currently has two 500kv transmission lines that restricts further use of the parcel. Had the original eight lots been individually developed, it is likely that the percentage of impervious surfaces would have been much greater than the amount that will occur as part of this Project.

Since the surface water eventually drains into the karst features that provide habitat for MCI, DVP has significantly upgraded the stormwater treatment system.

The stormwater system on site is going to be converted from a “dry” detention basin system to a “wet pond” retention system. The existing system is designed to hold runoff for a specified period of time, and then release the entire volume of the runoff. The new retention ponds are to be designed to retain a resident pool of standing water, which improves water quality treatment between storms and water releases will more closely mimic natural stormwater discharges.

The stormwater treatment system has been designed to effectively capture pollutants and contaminants through a series of containment areas and stormwater ponds prior to discharging and infiltrating into the potential MCI habitat areas. These controls are designed so that the flooded voids beneath and adjacent to the Project site will not be polluted by potential contaminants from the Project site. These controls will improve upon the pre-construction site conditions that allow for significant sedimentation (TSS), potential organic pollutants (i.e. Nitrates and Phosphorus), and other contaminants to reach detention basins and eventually discharge into the aquifer. An estimation of the potential water quality improvement is provided in Table 3. Based on a weighted percent design removal of Phosphorus for the entire area captured by the pre-construction and post-construction ponds, post-construction water quality will be 3.45 times higher than pre-construction conditions. In addition, existing sinkholes identified on the property will be reverse graded in order to maintain the infiltration of water and nutrients into the flooded voids. DVP will comply with all the state regulations pertaining to the creation and maintenance of the SWMPs. DVP will also enter into an implementing agreement with the FWS to ensure that the SWMP’s are maintained. Failure of the SWMPs that result in inadequate water quality conditions could negatively affect potential MCI populations in violation of the US ESA.

During construction, DVP has selected a foundation design that relies on piles to support infrastructure rather than installation of a more traditional foundation system that would involve filling the karst features with stabilizing material such as flowable fill. The more traditional construction techniques would permanently remove a greater extent of potential MCI habitat and may also result in water quality impacts to the phreatic zone due to the introduction of additional sediment and flowable fill material into flooded voids. In addition, while DVP anticipates up to 2,234 piles may be installed, only the minimum number necessary will be used. This would further minimize the level of anticipated impact to potential MCI habitat. Further, during installation of caissons, DVP will diligently work to avoid installation in karst features. While caissons are not anticipated to intersect areas containing phreatic water, by avoiding karst features, there will be significantly less potential to impact MCI habitat.

5.3 Measures to Mitigate Unavoidable Potential Impacts

While a robust avoidance and minimization plan has been developed, DVP anticipates the potential to have impacts during construction that rise to the level of take in the form of harm, harassment, or direct mortality of MCI and may also result in the loss of MCI habitat. Therefore, the conservation strategy incorporates a mitigation plan that is intended to adequately compensate for the take of up to 2,897 ft^2 of potential MCI habitat. The mitigation plan involves permanently protecting 6.79 acres that surround Brother Dave's Cave and an additional 9.64 acres of adjacent forested land. The cave provides high quality habitat for a known MCI population that is in close proximity of the Project site. While there is uncertainty as to whether the voids in the karst features below the Project site are hydrologically connected to Brother Dave's Cave, the cave and the Project site lie within the geographic limits of the same MCI population group.

DVP is working with Warren County to establish a protective agreement for the 6.79 acre swale that encompasses Brother Dave's Cave on the Fishnet County Park Property located immediately to the east of the Project site (Figure 5). The swale is an important feature that collects water and nutrients that are directed to Brother Dave's Cave. Brother Dave's Cave is another significant feature as it supports a known MCI population and has been used for research of the MCI for several years. Protection of the swale, which consists of Forest and Scrub-Shrub land cover, will provide a nutrient source and contamination removal protection to this system. DVP is also working with Warren County to protect the additional 9.64 acres of mature forest adjacent to and immediately east of the swale through a protective agreement in order to provide a buffer for the swale. Preservation of this wooded area would provide a buffer from localized development, assist with the removal of contaminants (including sediment) from water entering the swale, and provide additional nutrient contribution to the aquifer. Combined, the mitigation site that includes Brother Dave's Cave would permanently protect 16.43 acres that currently has no existing land protection.

In accordance with the protective agreement, Warren County will restrict development within the 16.43 acres by recording a deed in the proper County land records office designating the property as "Open Space Land," pursuant to the Open-Space Land Act, Va. Code §§10.1-1700 *et seq*. The deed will place limits on uses, activities and rights such as certain: industrial use, residential use, commercial use, agricultural use; vegetative clearing, development rights, subdivision rights, new utility placement, construction, littering, dumping, waste burning, grading, mineral recovery, excavation, dredging, placement of spoils, water withdrawals, signage, fencing, pesticide application, pet access, and mechanized vehicle and equipment use. Pre-existing easements, running from North to South parallel to the railroad tracks, for above ground electric transmission and telephone lines (no subsurface rights granted) and the associated maintenance will not be affected. Construction of trails, boardwalks, observation

areas, and other passive uses would still be permissible. Due to the proximity of the Project site and the Warren County property, the functional preservation of the Warren County property by protective agreement will allow for direct comparison between the two sites as these sites have similar geology, hydrology, soil characteristics, and, potentially, the same MCI population.

FWS must provide written concurrence that the terms of the agreement are acceptable before any activity potentially causing take can be undertaken. Also, any agreement must be approved by the Warren County Board of Supervisors after a public comment process.

The proposed mitigation site is considerably larger, at 16.43 acres, and provides habitat for a known MCI population. There is currently little information and no existing models to assess the amount of MCI habitat needed to compensate for impacts to 2,897 ft^2 of potential habitat. However, DVP developed a model that quantifies the change in net primary productivity (NPP) associated with construction of the Project site as a tool to estimate the benefit of protecting Brother Dave's Cave and the adjacent forested land. NPP was quantified using net values reported in Huston and Wolverton (2009). The values for NPP for the different land cover were estimated from Figure 2 and Figure 4 and provided in Table 2. The existing land cover (from 2008 aerial photography) is presented in Figure 2, while the proposed post-construction land cover is presented in Figure 4. The total acreage for each land cover type was estimated and total NPP was quantified for the site as the sum of NPP multiplied by acreage for each land cover type. Table 2 summarizes the results of this assessment. In brief it is estimated that approximately 40 percent of the land cover is vegetated as part of the post-construction condition. A net loss of 13,792 g/m2/acre/year occurs from construction of the Project.

The NPP for the 16.43 acre mitigation site is estimated to be 12,151 g/m2/acre/year, which would provide protection for a significant portion of the estimated net loss of NPP on the Project site due to changes in the land cover. A summary of this information is provided in Table 4.

While there is a small imbalance (1,641 g/m^2/acre/year), the NPP calculation is geared towards evaluating tracts of land based on their vegetation. It does not take into account other factors such as swales and surface water flow, which are important for the health of the MCI populations. The deficit in NPP is adequately addressed by the increased quality of habitat being preserved. The Fishnet swale is a contiguous forested tract and contains a known population of MCI. The Project site is lower quality and located in an industrial park that has existing development.

6.0 MONITORING AND REPORTING

In addition to providing compliance and effectiveness monitoring for the LEHCP, the monitoring plan will serve to increase overall knowledge of the species and adjacent Karst features.

The monitoring will incorporate two primary components that include water quality measurement and population assessment. In terms of water quality measurement, DVP will contract with DCR to conduct quarterly collection of data including temperature, conductivity, and water levels at Brother Dave's Cave and Power Plant Pit and Madison Saltpeter Cave in Augusta County as a reference site for an eight year period. During construction, visual inspections will be performed at each stormwater pond in accordance with the construction stormwater permit. Water quality sampling at the stormwater ponds shall also be performed in accordance with the stormwater permit that covers operation of the facility.

The population assessment will involve annual MCI population estimates during each year of the monitoring period. Again, DVP will contract with DCR to conduct these assessments. It is DVP's understanding that DCR has periodically conducted similar studies at the Karst locations (Brother Dave's Cave and Power Plant Pit) and has established relationships with the

respective property owners and access to their properties. The monitoring will cover Brother Dave's Cave, Power Plant Pit, and another cave with MCI populations to be used as a reference. The proposed monitoring plan developed by DCR is provided in Appendix A.

In accordance with the ITP, the research monitoring conducted by DCR will be required through January 1, 2020. This will encompass the construction period as well as five years of post-construction monitoring.

DVP will submit an annual report on the anniversary date of permit issuance of each calendar year of ITP coverage. The report will consist of:

1. Results of the water quality measurements and population assessments performed by DCR;
2. Copies of Discharge Monitoring Reports associated with applicable stormwater permit monitoring requirements; and
3. A construction activities summary for foundation and stormwater system construction activities conducted during the previous calendar year.

The final report shall be provided by January 31, 2020.

7.0 ADAPTIVE MANAGEMENT

DVP includes the two following adaptive management processes that relate to the implementation and effectiveness of mitigation. These are: the inability to obtain permanent protection of the above-described off-site MCI habitat; and, responding to monitoring results that suggest adverse changes to water quality and/or MCI population that is the subject of mitigation.

7.1 Protection of Offsite MCI Habitat

If the originally proposed mitigation parcels are unavailable, or DVP is not able to complete the legal transaction necessary to ensure permanent conservation, they must identify and conserve a parcel of equal or greater value, that satisfies the following criteria: located within MCI potential habitat in the northern genetic unit, similar overall acreage, protection of a known MCI population, a surface karst feature survey conducted by a qualified surveyor indicates comparable function in terms of water and nutrient re-charge, the estimated amount of NPP is comparable, and there are no existing encumbrances. Any alternative site must be approved in writing by FWS, which will determine the type of permit amendment that will be necessary pursuant to its regulations and Section 11.0 of the LEHCP.

7.2 Responding to Monitoring Results

If the monitoring, as defined in this plan in Section 6.0 and Appendix A, indicates an adverse change in water quality and/or MCI population and such a change is identified to be a result of the Project, DVP will address the situation in consultation with FWS and may require changes to the mitigation strategy, which could entail a permit amendment pursuant to Section 11 of the LEHCP. Should such monitoring results be collected, DVP shall visually inspect the Project site including the stormwater ponds and review station environmental and operating reports to determine if onsite conditions may be influencing downgradient water quality. If these changes to water quality or populations do not appear to be related to the Project but rather are attributed to natural system fluctuations, DVP will not be under any obligation to address the changed situation.

8.0 FUNDING

8.1 Funding for Minimization and Mitigation Purposes

In a contract with DCR signed April 15, 2011 (Appendix A), DVP committed to provide startup and operational funding to DCR for one year of quarterly data collection and population estimates which began in Spring 2011. Funding provided to date has included $14,123 for startup and equipment costs and $13,902 for first year monitoring. Before issuance of the ITP, DVP will enter into a Research Monitoring Contract with DCR to fund eight years of additional MCI research and water monitoring to end on January 1, 2020. The total amount of funding will be $111,250. Per the terms of the contract, the MCI research and water monitoring will proceed regardless of whether (i) the Project is completed or remains operational or (ii) the ITP is suspended or terminated.

9.0 ALTERNATIVES

9.1 No Project Alternative

Choosing not to construct the Project would not satisfy the purpose and need of meeting the growing need for new capacity and energy. This need has been identified in DVP's 2009 and 2010 system-wide Integrated Resource Plans ("2009 and 2010 Plans"), which determine the mix of resources necessary to meet future capacity and energy needs in an efficient and reliable manner at the lowest reasonable cost. DVP projects that the peak demand for this area will increase by approximately 4,900 MW over the next ten years. The need for this project to enter service by 2015 is critical to maintaining a reliable source of power for the region.

Not constructing the Project in this location could also result in the continued introduction of sedimentation and pollutants into MCI habitat due to existing site conditions. Proposed funding for monitoring of MCI populations would no longer be provided, which would likely prevent obtaining further understanding of the species. Preservation of the swale, Brother Dave's Cave, and surrounding forested buffers also would not occur.

9.2 Alternative 1 (Preferred Alternative)

Alternative 1, the Preferred Alternative is the proposed Project, which presents DVP with a unique opportunity to add a state-of-the-art generating facility in a high demand region that will provide substantial long-term savings and other benefits to customers. The Project will supply a need for new generating capacity and energy that is clear and immediate, and it will do so at reasonable cost levels, not only with regard to its construction but also as it operates over its 36-year projected service life. The Project will ensure a reliable and adequate supply of electricity at a reasonable cost to meet DVP's projected native load obligations. Project highlights include:

- Very favorable customer savings, when compared to market purchases and other alternatives, with a net present value projected to be approximately $1.187 billion;
- Advantageous location that enhances system reliability;
- Highly-efficient combined-cycle technology;
- Low construction costs on a $/kW installed basis, with a high level of price certainty;
- Low electrical interconnection cost;
- Cost-effective firm gas transportation contract;

- State-of-the-art environmental controls, including a proposed stormwater system that will more effectively remove sedimentation, potential organic pollutants, and other contaminants prior to discharge into potential MCI habitat;
- Utilization of piles as part of the foundation design, which greatly reduces potential impacts to the MCI when compared with traditional construction techniques as described in Section 5.2;
- Significant economic benefits for both the region and VA; and
- Proven DVP team that has demonstrated construction and operations experience to accomplish large generating facility projects in a safe, timely, and cost-effective manner.

The Project is located within an existing industrial park and is traversed by an existing DVP 500 kV transmission line, is close to water, sewer, and natural gas supplies. Gas will be provided to the site under a firm, long-term and cost-effective natural gas transportation contract, and the nearby Town of Front Royal will provide water and sewer services to the facility. The site is in close proximity to DVP's Northern VA service area, which continues to experience high levels of demand and load growth. Given its proximity to federal government facilities, data centers, and large scale commercial development, the Project's location will improve our system's ability to supply this demand reliably and allows for a low cost transmission interconnection.

9.3 Other Alternatives Considered

Alternative sites and construction procedures have been examined as part of this section. The results of these evaluations are summarized below.

Alternative Sites

There are other potential locations within the region to site a power station of this size. However, other alternative sites would not likely provide the similar combination of resources to similarly satisfy the purpose and need of the Project. Other alternative sites would not provide the combination of an existing transmission line and utilities that this site offers in addition to avoiding and minimizing impacts to critical environmental features such as wetlands, waterbodies, and mature forests.

Alternative Construction Procedures

Alternative construction procedures could involve utilizing the same site while using more traditional methods to construct the facility. The power plant and related infrastructure on the site could be constructed utilizing paved surfaces and gravel areas without revegetating any of the property, which would result in an even greater reduction of NPP with respect to potential MCI habitat.

The project could also use more traditional methods for foundation design including filling the karst features with stabilizing material (as opposed to piles) that would result in a significantly greater permanent encroachment into potential MCI habitat. Traditional construction techniques would also result in a much greater potential disturbance to water quality in the phreatic zone due to the introduction of additional sediment and flowable fill into flooded voids.

The site could also be designed to use the existing stormwater system on the property without the use of oil/water separators, hydrocarbon detectors and shut-off valves. This action would allow for the continued migration of sedimentation and pollutants into the aquifer and would not provide the proper protections in the event of an accidental spill at the facility.

In summary, the use of traditional construction methods on the existing site would result in greater impacts to the MCI.

10.0 UNFORESEEN CIRCUMSTANCES

FWS' permitting regulations require that a LEHCP specify the procedures to be used for dealing with both changed and unforeseen circumstances that may arise during the implementation of the LEHCP. These rules incorporate FWS' "No Surprises" Policy, which defines "unforeseen circumstances" and "changed circumstances" and describes the obligations of the permittee and the FWS. The Policy and Regulations are summarized below.

The purpose of No Surprises is to provide assurances to nonfederal landowners participating in habitat conservation planning under the US ESA that no additional land restrictions or financial compensation will be required for species adequately covered by a properly implemented LEHCP, in light of unforeseen circumstances, without the consent of the permittee. Changed circumstances refer to changes affecting a species of geographic area covered by the LEHCP that can reasonably be anticipated by the FWS and that can be planned for (e.g., the listing of a new species, or fire or other natural catastrophic events in areas prone to such events). The policy defines unforeseen circumstances as changes in circumstances that affect a species of geographic area covered by the LEHCP that could not reasonably be anticipated by the FWS at the time of the plan's negotiation and development and that result in a substantial and adverse change in status of the covered species.

In determining whether any event constitutes an unforeseen circumstance, FWS will consider, but not be limited to, the following factors: size of the current range of the affected species; percentage of range adversely affected by the LEHCP; ecological significance of that portion of the range affected by the LEHCP; level of knowledge about the affected species and the degree of specificity of the species' conservation program under the LEHCP; and whether failure to adopt additional conservation measures would appreciably reduce the likelihood of survival and recovery of the affected species in the wild.

If the FWS determines that the unforeseen circumstances will affect the outcome of the LEHCP, additional conservation and mitigation measures may be necessary. Where the LEHCP is being properly implemented and an unforeseen circumstance has occurred, the additional measures required of the permittee must be as close as possible to the terms of the original LEHCP and must be limited to modifications within any conserved habitat area or to adjustments within lands or waters that are already set aside in the LEHCP's operating conservation program. Additional conservation and mitigation measures shall not involve the commitment of additional land or financial compensation or restrictions on the use of land or other natural resources otherwise available for development or use under the original terms of the LEHCP without the consent of the permittee. Resolution of the situation shall be documented by letters between FWS and the permittee. However, nothing in the No Surprises rule limits or constrains the FWS, any Federal, State, local or Tribal government agency, or private entity from taking additional actions at its own expense to conserve a species included in the LEHCP.

The low likelihood of changed circumstances during the duration of the permit makes the occurrence of any such circumstance within the permit period unlikely. The LEHCP identifies the following actions that were considered for inclusion as changed circumstances:

<u>Listing of New Species</u>

There are no known candidate species currently documented within the limits of the Project. The LEHCP only addresses the conservation of MCI. Conservation for no other species is

described in the LEHCP. Thus, there are no circumstances in which a newly-listed species would be considered "adequately covered" and automatically covered under the associated ITP. Rather, should future US ESA listings occur, any newly-listed species would require a formal permit amendment to provide incidental take coverage, if needed.

Change In Listing Status

If the MCI is delisted, the permit continues to be valid and LEHCP conditions remain in effect. No more or no less minimization will be required. If the MCI's status is upgraded to endangered during construction activities FWS will determine whether the continued implementation of the LEHCP will jeopardize the continued existence of the species, in light of the new information or threats that caused the upgrade in status. If so, the permit may be suspended or revoked, or its terms changed through the amendment process identified in Section 11.0 of the LEHCP.

Unforeseen Geologic Event

During construction activities, the minor potential exists for a geologic event to occur on the Project site that might result in adverse impacts to potential MCI habitat and populations. This type of event might involve an earthquake or sinkhole collapse that results in impacts to the on-site stormwater system. Should such an event occur, the permittee will contact the FWS to report the event, and the stormwater system will be reconstructed to original specifications. Provided that these procedures are followed, there are no additional unforeseen circumstances anticipated with respect to these potential events.

11.0 PERMIT AMENDMENTS

There are two types of changes that may be made to the LEHCP and/or the ITP and/or its associated documents: minor and major amendments. Minor and major amendments will be processed in accordance with all applicable legal requirements, including but not limited to the ESA, NEPA, and any applicable Federal regulations.

11.1 Minor Amendments

Minor amendments to the LEHCP are changes to the management actions including monitoring and responses to changed circumstances. Minor amendments do not modify the scope or nature of activities or actions covered by the section 10(a)(1)(B) permit or result in operations under the LEHCP that are significantly different from those contemplated or analyzed in connection with the LEHCP as approved, adverse impacts on the environment that are new or significantly different from those analyzed in connection with the LEHCP as approved or additional take not analyzed in connection with the LEHCP as approved.

Minor amendments to the LEHCP may include, but are not limited to the following:

1. Correction of the site map to address errors in the covered area boundary location.
2. Modifying existing or developing new take avoidance measures.
3. Modifying the reporting schedule or notification process.
4. Minor changes to the monitoring method.
5. Any other modifications to the LEHCP that are consistent with the biological goals and objectives of the LEHCP that the FWS has analyzed and agreed to, and that will not result in changes to the operations under the LEHCP that are significantly different from those analyzed in connection with the LEHCP as approved.

The party proposing the minor amendment to the LEHCP shall circulate the proposed amendment along with an explanation of why the amendment is necessary or desirable. Protocol for accepting or disapproving the amendment will follow guidance in the LEHCP Handbook (FWS 1996).

11.2 Major Amendments

The following summarizes the types of changes that may require a plan amendment and the procedure for approval.

Major amendments may include any of the following types of changes to the LEHCP:

1. The listing under the ESA of a new species or critical habitat that may be affected by the covered activities of the proposed Project.
2. Significant changes to the LEHCP which were not addressed in the LEHCP, such as changes to the covered activities or changes in the permit duration.

The procedure for a major amendment will follow guidelines in the LEHCP Handbook (FWS 1996). Following receipt of a complete application package for a major amendment to a LEHCP or ITP, the FWS will publish a notice of the proposed amendment to the Permit in the Federal Register. The major amendment will be treated as an original permit application. The amendment will require a revised LEHCP document, application form and the appropriate fee.

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TABLES

Table 1

POTENTIAL MCI HABITAT ENCROACHMENT SUMMARY

Facility	Estimated Total Number[2]	Cross Section Area (square feet)	Approximate Area of Encroachment		
			Acres	Square Feet	Percent
Footprint Surface Area in Karst Topography					
Pilings[1]	2,234	1	0.0513	2,234.00	-
Transmission Line Caissons	13	51	0.0152	663.00	-
		Total Encroachment	**0.0665**	**2,897.00**	**-**
Percent Encroachment on Site					
Total Area of Warren Station Facility Project			39.00	1,698,840	-
Total Area of Subsurface Support Encroachment			0.0665	2,897.00	-
Percentage of Subsurface Support Encroachment on Project Area			-	-	0.17

Notes:

[1] Schnabel Engineering. 2011. Reponses to questions, potential Madison Cave isopod habitat.

[2] Estimate includes added 10% contingency.

Table 2

NUTRIENT CONTRIBUTION SUMMARY

Surface Cover Type	Pre-Construction Conditions			Post-Construction Conditions			Difference in Nutrient Contribution Between Existing and Proposed ($g/m^2/acre/year$)
	Area of Surface Cover (acres)	Net Primary Productivity[1] ($g/m^2/year$)	Nutrient Contribution[1] ($g/m^2/acre/year$)	Area of Surface Cover (acres)	Net Primary Productivity[1] ($g/m^2/year$)	Nutrient Contribution[1] ($g/m^2/acre/year$)	
Pavement	0.7	0	0	3.1	0	0	0
Structures	0.0	0	0	3.7	0	0	0
Gravel	0.0	0	0	14.9	0	0	0
Grass/Disturbed	18.3	393	7,192	17.4	393	6,838	- 354
Partially Forested	11.5	586	6,739	0.0	586	0	- 6,739
Forest	8.6	779	6,699	0.0	779	0	- 6,699
Totals	**39.1**	**-**	**20,630**	**39.1**	**-**	**6,838**	**- 13,792**

Note:

[1] Published values for surface cover nutrient contribution include 779 $g/m^2/year$ for mature forest and 393 $g/m^2/year$ for grass and shrub dominated areas (Huston and Wolverton, 2009). Huston and Wolverton did not report values for pavement, structures, or gravel. Comparative productivity values for grassland, shrubland, and lawn are based on values reported in the literature. A value of 586 $g/m^2/year$ was assigned to partially forested areas that comprised of a combination of grass and trees.

Table 3

SURFACE WATER QUALITY

Site	Basin Size (acres)	Phosphorus Removal (percent)	Approximate Removal Capacity (per acre based on a 100% removal)[1]
Pre-Construction	28.6	20	5.72
Post-Construction	35.3	56	19.75

Note:

[1] Ratio of removal was determined by dividing the post-construction value (19.75) by the pre-construction value (5.72) to obtain the resultant 3.45 ratio of improved water quality.

Table 4

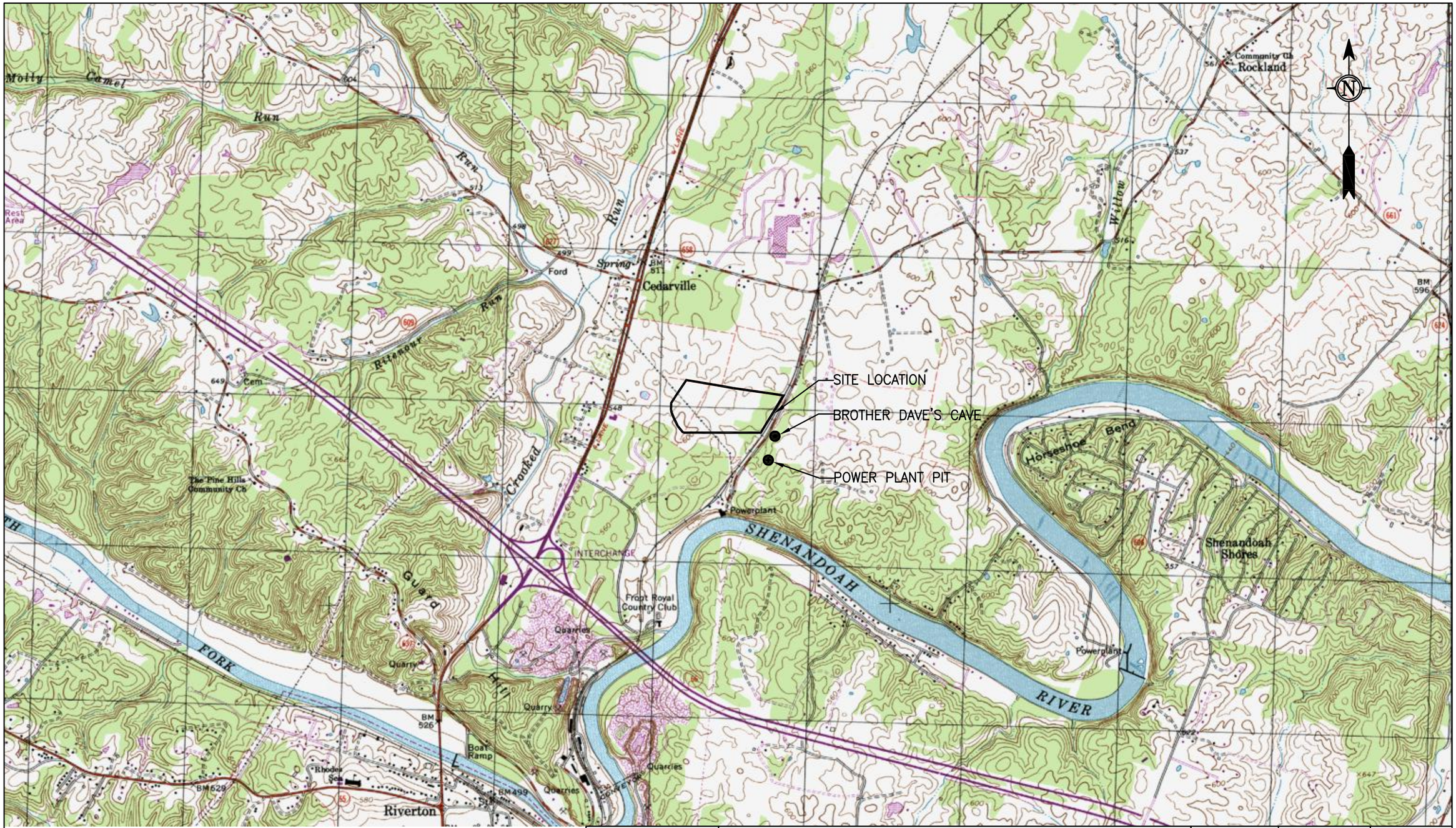
PROPOSED PROTECTED PROPERTY

Total Area	Land Cover	Area of Surface Cover (acres)	Net Primary Productivity[1] ($g/m^2/year$)	Nutrient Contribution[1] ($g/m^2/acre/year$)	Important Habitat
16.43	Completely Forested	13.07	779	10,182	This area includes the protection of Brother Dave's Cave, a known location of the MCI.
	Partially Forested	3.36	586	1,322	
	Totals	**16.43**	**-**	**12,151**	

Note:

[1] Published values (Huston and Wolverton. 2009) for surface cover nutrient contribution include 779 g/m^2/year for mature forest and 393 g/m^2/year for grass areas. Huston and Wolverton did not report values for pavement, structures, or gravel. Comparative productivity values for grassland, shrubland, and lawn are based on vales reported in the literature. A value of 586 g/m^2/year was assigned to partially forested areas and scrub-shrub areas.

FIGURES



REFERENCE:
U.S.G.S. 7.5 MINUTE QUADRANGLE
FRONT ROYAL (1994) VIRGINIA

SCALE: 1" = 2000'

2000 0 2000 4000

NOTE:
PROJECT SITE IS LOCATED ON LOTS 1 AND 3 OF
WARREN INDUSTRIAL PARK, WARREN COUNTY, VA.

gai consultants
Richmond Office
4198 Cox Road, Suite 114
Glen Allen, VA 23060
Phone: 804-270-9357

SITE LOCATION MAP
FIGURE 1

WARREN COUNTY ENERGY CENTER
WARREN COUNTY, VIRGINIA

DWN. IP	CHKD. CLD	SCALE:
APPD. RPH	DATE 3/17/11	1"=2000'

DRAWING NUMBER
C110155-00-000-00-E-B001
REV

PLOTTER FILE: ENVIRONMENTAL_COLOR.CTB

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		Hydrologic Soil Class				Infiltration or Offsite SWM
Ground Cover Area (Acre)	Total SWM	Soil B	Soil C	SWM Pond #1	SWM Pond #2	
Pavement Area	0.73	0.52	0.21	0.40	0.32	0.01
Grass Area	18.30	14.01	4.29	9.26	5.04	4.00
Partially Forested Area	11.50	10.05	1.45	6.78	0.90	3.82
Completely Forested Area	8.60	4.53	4.07	3.79	2.10	2.71
TOTAL	39.13	29.11	10.02	20.23	8.36	10.54

SCALE: 1" = 80'

80 0 80 160

NO.	DATE	DWN	CHKD	APPVD	DESCRIPTION
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REVISIONS

This drawing was produced with computer aided drafting technology and is supported by electronic drawing files. Do not revise this drawing via manual drafting methods.

PRE-CONSTRUCTION CONDITIONS
FIGURE 2

WARREN COUNTY ENERGY CENTER
WARREN COUNTY, VIRGINIA

gai consultants

DRAWN DMM
CHECKED RPH
APPROVED CLD
DATE 03/17/11

DRAWING NUMBER
C110155-00-00-00-E-D002

SHT. NO. 1 OF 2
REV

RICHMOND OFFICE • 4198 COX ROAD, SUITE 114, GLEN ALLEN, VA 23060

GAI DRAWING FILE NO.C110155-00-000-00-E-D002

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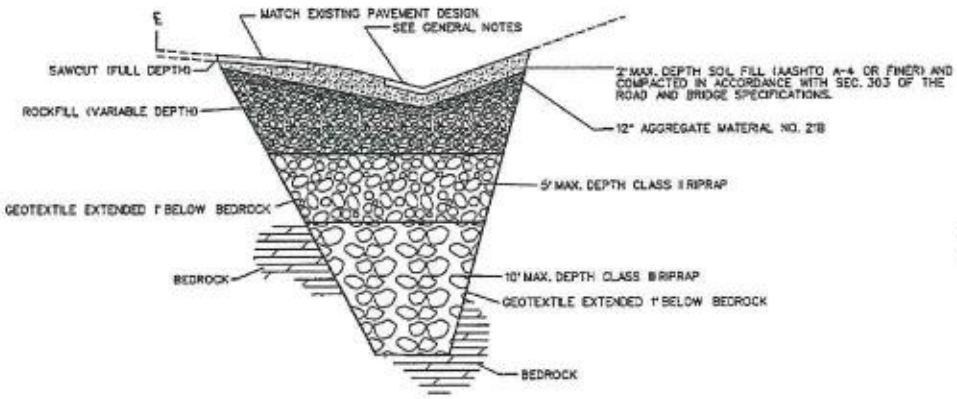
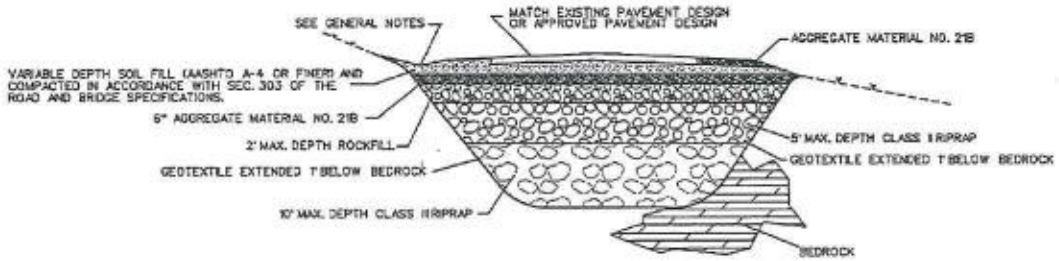
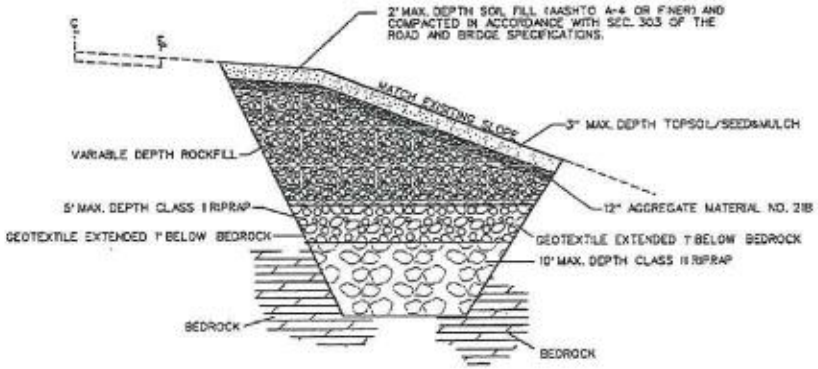
SINKHOLE IN DITCHLINE
(NOT TO SCALE)



SINKHOLE AT GRADE/UNDER FILL
(NOT TO SCALE)



SINKHOLE IN SLOPE
(NOT TO SCALE)



GENERAL NOTES:

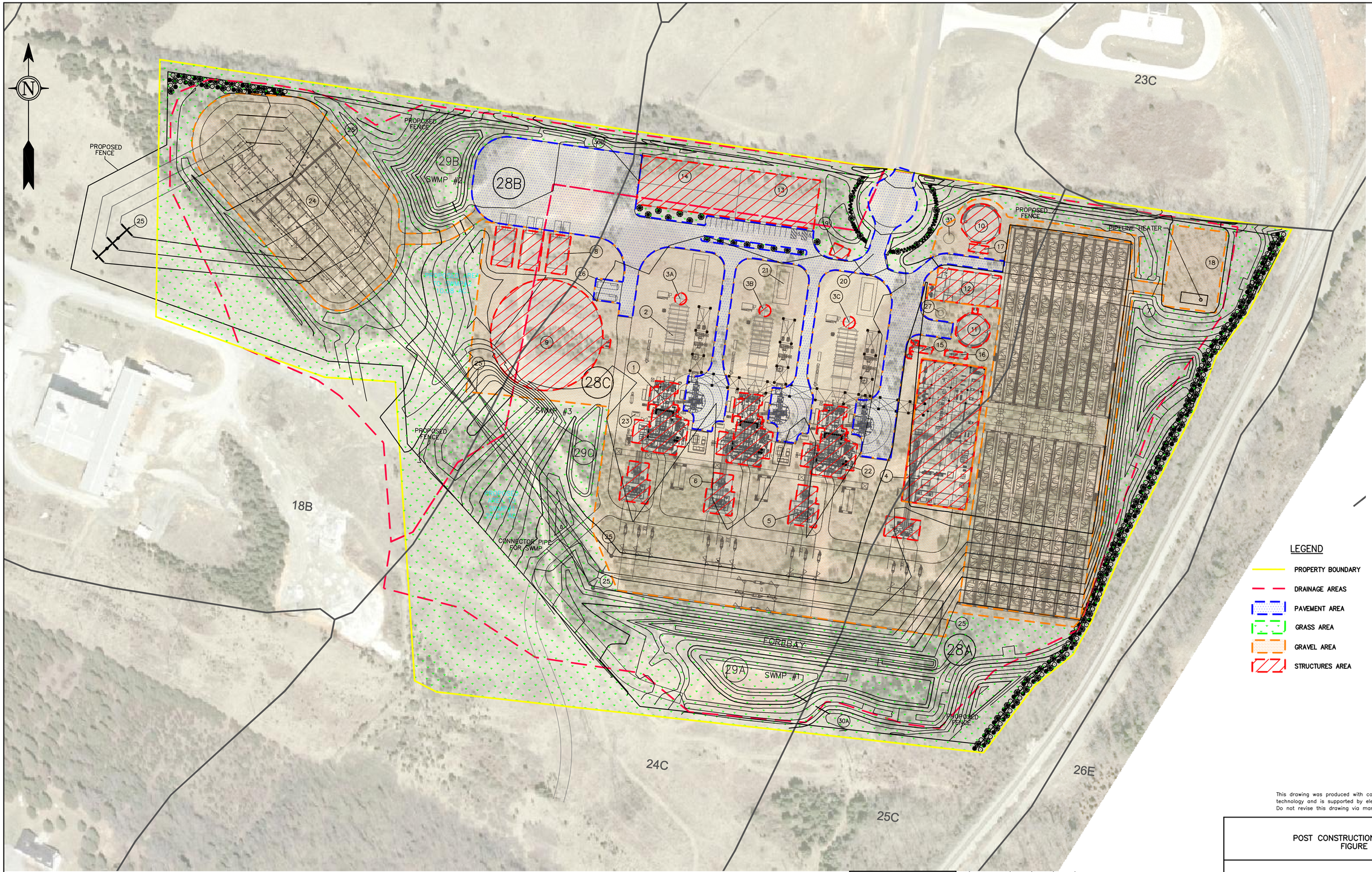
1. PRIOR TO ANY SINKHOLE EXCAVATION THE CONTRACTOR SHALL CONTACT THE CQA INSPECTOR.
2. EACH SINKHOLE SHOULD BE TREATED BASED ON THE SPECIFIC CONDITIONS OF THE SITE.
3. CONSECUTIVE LAYERS OF AGGREGATE SHALL BE PLACED IN SUCH A MANNER AS TO PREVENT MIGRATION OF SMALLER AGGREGATES INTO VOIDS IN LARGER AGGREGATES.
4. WHEN THE DEPTH OF A SINKHOLE OR A DEPRESSION IS LESS THAN 10', ROCKFILL SHALL BE USED FOR BACKFILL IN LIEU OF DRY RIP-RAP AND SHALL BE CAPPED WITH NO. 21B AGGREGATE, AND GEOTEXTILE AS NOTED ON THE APPLICABLE DETAIL.
5. TREATMENT SHALL INCLUDE CLEARING AND GRUBBING, STRIPPING TOPSOIL AND REMOVING EXCESS ORGANIC MATERIAL. ALL FOREIGN MATTER INCLUDING TRASH, AND OTHER REFUSE OR WASTE MATERIALS SHALL BE REMOVED.
6. EXCAVATION NECESSARY FOR PLACEMENT OF THE SINKHOLE FILL SHALL BE MEASURED AND PAID FOR AS REGULAR EXCAVATION IN ACCORDANCE WITH THE SECTION 303 OF THE SPECIFICATIONS. ALL OTHER MATERIAL SHALL CONFORM TO AND BE MEASURED AND PAID FOR IN ACCORDANCE WITH THE APPLICABLE SECTIONS.
7. GEOTEXTILE MATERIAL SHALL CONFORM TO THE CURRENT SPECIAL PROVISION FOR GEOTEXTILES.
8. WHEN GRADE OF DITCH IS LESS THAN 5%, MODIFIED PG-2A IS REQUIRED, EXTENDED 10' BEYOND DISTURBED AREA. WHEN GRADE OF DITCH EXCEEDS 5%, CONSTRUCT PER VDOT ROAD AND BRIDGE SPEC'S OR MATCH EXISTING, AS APPROVED BY THE ENGINEER.
9. IN THE EVENT SURFACE DRAINAGE CANNOT BE DIRECTED AWAY FROM THE SINKHOLE OR ROCK IS NOT ENCOUNTERED, THE CONTRACTOR SHALL CONTACT THE CQA INSPECTOR PRIOR TO ANY CONSTRUCTION.

FIGURE 3

SINKHOLE TREATMENT DETAILS

WARREN COUNTY ENERGY CENTER

WARREN COUNTY, VIRGINIA



LEGEND

- PROPERTY BOUNDARY
- DRAINAGE AREAS
- PAVEMENT AREA
- GRASS AREA
- GRAVEL AREA
- STRUCTURES AREA

This drawing was produced with computer aided drafting technology and is supported by electronic drawing files. Do not revise this drawing via manual drafting methods.

Ground Cover Area (Acre)	Total SWM	Hydrologic Soil Class Soil B	Soil C	SWM Pond #1	SWM Pond #2	Infiltration or Offsite SWM
Pavement Area	3.11	2.14	0.97	2.33	0.78	0.00
Grass Area	17.42	11.66	5.76	8.20	5.35	3.87
Structures Area	3.70	3.22	0.48	2.78	0.92	0.00
Gravel Area	14.90	12.09	2.81	12.22	2.68	0.00
TOTAL	39.13	29.11	10.02	25.53	9.73	3.87

SCALE: 1" = 80'

80 0 80 160

NO.	DATE	DWN	CHKD	APPVD	DESCRIPTION
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REVISIONS

POST CONSTRUCTION CONDITIONS
FIGURE 4

WARREN COUNTY ENERGY CENTER
WARREN COUNTY, VIRGINIA

gai consultants

DRAWN DMM
CHECKED RPH
APPROVED CLD
DATE 03/17/11

DRAWING NUMBER
C110155-00-00-00-E-D001

SHT. NO. 2 OF 2

REV

RICHMOND OFFICE • 4198 COX ROAD, SUITE 114, GLEN ALLEN, VA 23060

GAI DRAWING FILE NO. C110155-00-000-00-E-D001

PLOTTER FILE: GAI_ENVIRONMENTAL_COLOR.ctb

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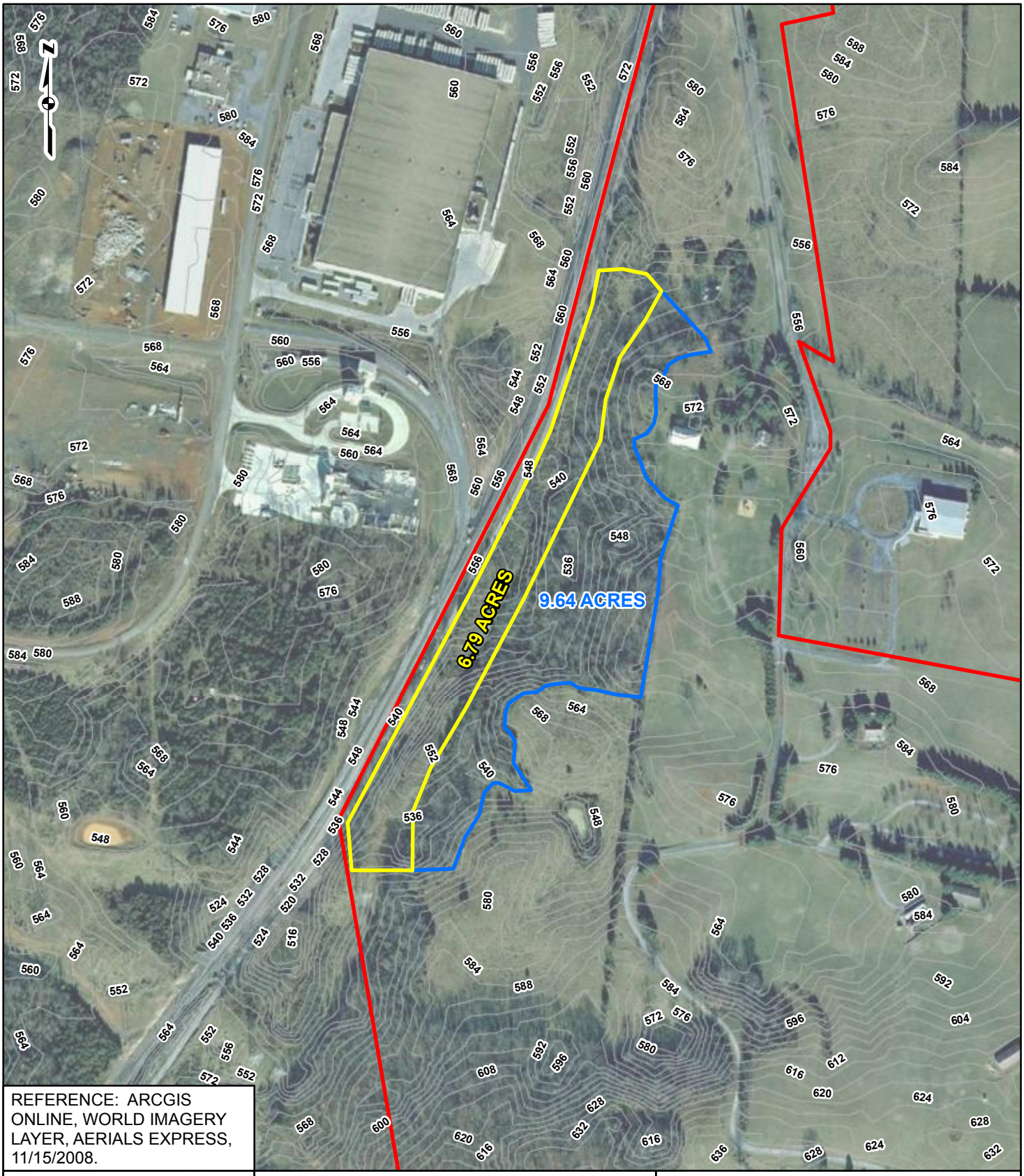
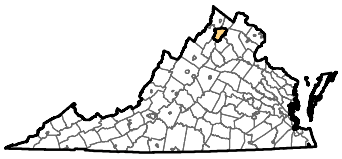


REFERENCE: ARCGIS ONLINE, WORLD IMAGERY LAYER, AERIALS EXPRESS, 11/15/2008.

PROJECT LOCATION



WARREN COUNTY, VIRGINIA

LEGEND

- 4-FT CONTOUR INTERVAL
- BUFFER AREA [1]
- COUNTY PRESERVATION AREA (APPROXIMATE) [1]
- COUNTY PROPERTY BOUNDARY

[1] PROPOSED DEED RESTRICTION ON PROPERTY

0 200 400 800 Feet

FIGURE 5
PROPOSED PROTECTIVE AGREEMENT PROPERTY

WARREN COUNTY ENERGY CENTER
WARREN COUNTY, VIRGINIA

DRAWN BY: JWB
CHECKED: MDO

DATE: 04/18/2011
APPROVED: SEG

P:\PIT\2011\C110155.00 Dom Warren MCI\GIS\PROJECT_FILES\FIGURE5_PROTECTION_PLAN_052511.mxd

PHOTOGRAPHS

Photograph 1. View Along Southern Portion of Site,
Facing West with Detention Basin in Background

Photograph 2. View of Existing Detention Basin
on Southern Portion of Property that Drains to Sinkhole

Photograph 3. View of Open Area, Adjacent to paved Access Road, Facing South

Photograph 4. View of Open Area, Looking Southwest

Photograph 5. View of Sparsely Vegetated Open Area
with Early Successional Forest in Background

Photograph 6. View Along Paved Access Road, Facing West

APPENDIX A

DCR MONITORING PLAN

MONITORING MADISON CAVE ISOPOD POPULATIONS AND HABITAT ADJACENT TO DVP's WARREN COUNTY POWER STATION, FRONT ROYAL, VIRGINIA

Project Description and Cost Estimate

Wil Orndorff, Virginia Natural Heritage Program

Task 1 – Setup and Development of Monitoring Plan ($14,123.79)

Three monitoring locations will be set up with instrumentation and monitored continuously for three parameters relevant to the Madison Cave habitat. These parameters are aquifer level, conductivity, and temperature. Two of the locations are immediately proximal to the Warren County Power Station and appear to receive runoff from the area occupied by the Power Station. These locations are Power Plant Pit and Brother Dave's Cave. A third Madison Cave Isopod location – either Front Royal Caverns or the type locality at Cave Hill (Augusta County) – will be used as a control.

Natural Heritage staff will procure and install instrumentation at these monitoring sites and begin logging of the aquifer levels, conductivity, and temperature.

Natural Heritage staff will work collaboratively with the Virginia Department of Game and Inland Fisheries, FWS, and DVP to develop a detailed monitoring plan, including Quality Assurance/Quality Control (QA/QC) measures.

Natural Heritage staff will assist DVP and its agents in design and implementation of slope stabilization at entrance to Power Plant Pit. This is for the purpose of establishing and maintaining safe access to the monitoring site, and to minimize anomalies in the dataset resulting from slope failure events.

Task 2 – Year One Monitoring ($13,902.18) and Subsequent Monitoring Years

Natural Heritage staff will complete one, two-cycle mark-recapture population estimate at each site between May 1 and October 1 of each monitoring year. Preliminary results (population estimates) will be provided within two weeks of completion of the mark-recapture experiment.

Natural Heritage staff will complete quarterly downloads of conductivity/temperature and level loggers at each site. Raw data files will be provided to DVP within 2 weeks of each download.

Natural Heritage staff will produce an annual report for the first monitoring year due in June of each year. Annual reports will be provided to DVP and FWS and all data will remain in the public domain. All data resulting from this study will remain in the public domain.

CONTRACT FOR SERVICES BETWEEN THE VIRGINIA DEPARTMENT OF CONSERVATION AND RECREATION, DIVISION OF NATURAL HERITAGE AND VIRGINIA ELECTRIC AND POWER COMPANY D/B/A DOMINION VIRGINIA POWER

This is a Contract for Services between Virginia Electric and Power Company doing business as Dominion Virginia Power (DVP) and the following person(s) and/or entities (the "Contractor"):

Name of Contractor:	Virginia Department of Conservation and Recreation, Division of Natural Heritage
Address:	217 Governor Street, Richmond, VA 23219
Name and Title of Contact:	Wil Orndorff, Karst Protection Coordinator
Telephone Number:	(540) 553-1235

PREAMBLE: DVP is proposing the construction of a new power station facility located in Warren County, Virginia known as the Warren County Power Station (Project). Preliminary site earthwork for the Project will begin no earlier than April 25, 2011 (Construction Start Date). The Project is located on an approximately 39 acre parcel in an area where known karst formations occur. The karst formations within the Project area could include habitat for the Madison Cave Isopod, *Antrolana lira* (MCI) that is listed as a threatened species under the state and federal endangered species acts. DVP and Contractor desire to assess the potential effects of the Project on possible habitat and populations of the MCI. Accordingly, DVP wishes to engage the services of Contractor to conduct the study set out below.

NOW, THEREFORE, in consideration of the mutual covenants contained herein, and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, DVP and the Contractor agree as follows:

1. **CONTRACTOR DUTIES.** The Contractor, who represents that the Contractor is qualified and willing to perform the tasks described herein as an independent contractor, shall purchase all required equipment, setup, operate and maintain all equipment in accordance with manufacturer's specifications and perform the agreed upon studies of the MCI in its habitat located in Brother Dave's Cave and Power Plant Pit located in Warren County Virginia and at a third location with a known population of the MCI to be selected by the Contractor.

   The Contractor shall be responsible for obtaining landowner permission for access to the study sites.

2. **PAYMENTS.** For the services described herein and all goods and materials supplied and expenses incurred by the Contractor, DVP shall pay the Contractor $28,025.97 in accordance with the summary of costs included in the Exhibit "A". Payment is to be made within twenty one days of contract signature date.

3. **TERM OF CONTRACT.** This contract shall begin on date of signature and shall continue in force for a period of one year unless mutually terminated or modified through written amendment by the parties at an earlier date. Any extension beyond such terms must be in writing and signed by DVP. There shall be no obligation to any of the parties after this contract has expired.

4. **MONITORING STUDY TERMS.** The Contractor shall perform the study in accordance with the following tasks:

   Task 1 – Setup and Development of Monitoring Plan

   Three monitoring locations will be set up with instrumentation and monitored continuously for three parameters relevant to the MCI habitat. These parameters are aquifer level, conductivity, and temperature. Two of the locations are immediately proximal to the proposed Project site and appear to receive runoff from site. These locations are Power Plant Pit* and Brother Dave's Cave. A third MCI location – either Front Royal Caverns or the type locality at Cave Hill (Augusta County) – will be used as a control.

   Within 1 month of contract signature date, Natural Heritage staff will procure and install instrumentation at these monitoring sites and begin logging of the aquifer levels, conductivity, and temperature.

   Within 3 months of contract signature date, Contractor will work collaboratively with the Virginia Department of Game and Inland Fisheries, the United States Fish and Wildlife Service, and DVP to develop a detailed monitoring plan, including Quality Assurance/Quality Control (QA/QC) measures.

   * - Note: all activities at Power Plant Pit are contingent upon permission from the owner, Allegheny Power.

   Task 2 – Year one monitoring

   Contractor will complete one, two-cycle mark-recapture population estimate at each site between May 1 and October 1, 2011. Preliminary results (population estimates) will be provided within two weeks of completion of the mark-recapture experiment.

   Contractor will complete quarterly downloads of conductivity/temperature and level loggers at each site. Raw data files will be provided to DVP within 2 weeks of each download.

   Contractor will produce an annual report due thirteen months after the contract signature date.

   All data resulting from this study will remain in the public domain.

5. **LIABILITY/INSURANCE.** The Contractor is and will be acting as an independent contractor in the performance of this work, and it agrees to be responsible, where found liable and to the extent covered by insurance or specified by statute, for the payment of those claims for loss, personal injury, death, property damage, or otherwise arising out of any action or omission of its employees or agents in connection with the performance of this work. The Contractor participates in a self-insurance program administered by the Commonwealth of Virginia, which provides liability coverage for the Contractor, its officers, employees and agents for acts or omissions resulting in legal liability.

6. **INDEPENDENT CONTRACTOR.** The parties intend that an independent contractor-client relationship will be created by this contract. The conduct and control of the work lie solely

within the purview of the Contractor. The Contractor is not to be considered an agent or employee of DVP for any purpose, and no joint venture or principal-agent relationship exists. The Contractor and employees of the Contractor are not entitled to any of the benefits that DVP provides for its employees. Neither DVP nor the Contractor shall have any right, power, or authority to create any obligation, expressed or implied on behalf of the other.

7. **ASSIGNMENT/SUBCONTRACT.** The Contractor may not assign or transfer this contract, except as described in Task 1, paragraph 4 of the Monitoring Study Terms, without prior written consent of DVP.

8. **OWNERSHIP OF DOCUMENTS AND DATA.** Any reports, studies, photographs (and negatives), computer programs, drawings, writings or other similar works or documents, along with all supporting data and material, produced under this contract are the property of the Contractor. Data will be shared with DVP through interim and final reports. Direct access to data shall be provided to DVP in the event that it becomes necessary to resolve~~d~~ questions or scientific integrity. These materials and data may be used by DVP for non-commercial uses with an acknowledgement that the materials and data were developed by the Contractor.

9. **USE OF DVP NAME/LOGO.** The Contractor may not use DVP's name and/or logo in any way without prior written consent from DVP, except to the extent the work performed contemplates their inclusion in the final work product.

10. **CONFIDENTIAL INFORMATION.** During the course of the performance of this contract, the Contractor may have access to materials, data, strategies, other information relating to DVP and its programs, or systems, which are intended for internal use only. Any such information acquired by the Contractor shall not be used, published, or divulged by the Contractor to any person, firm, or corporation or in any advertising or promotion regarding the Contractor or the Contractor's services, or in any manner or connection whatsoever without first having obtained written permission of DVP, which permission DVP may withhold at its sole discretion.

11. **TAXES.** The Contractor agrees to be responsible for any and all filing and payment of taxes and for compliance with any and all provision and requirements arising under any applicable tax law. Neither federal, nor state, nor local income tax, nor payroll tax of any kind shall be withheld or paid by DVP on behalf of the Contractor, or employees of the Contractor. If appropriate, DVP shall report all fees paid to the Contractor to the IRS on Form 1099.

12. **COMPLIANCE WITH LAWS.** The Contractor represents, warrants, and agrees that, in connection with the transactions contemplated by this contract: (a) the Contractor can lawfully work in the United States; (b) the Contractor shall obtain, at its own expense (except to the extent otherwise explicitly stated in this contract) any permits or licenses required for the Contractor's services under this contract; and (c) the Contractor shall comply with all statutes, laws, ordinances, rules, regulations, court orders, and other governmental requirements of the United States and the Commonwealth of Virginia which are applicable to the work to be done by the Contractor under this contract (In each case, an "Applicable Law"). The Contractor shall not take any actions that might cause DVP to be in violation of any of such Applicable Laws.

13. **CHOICE OF LAW/FORUM.** This contract shall be interpreted, construed and governed by the laws of and such laws of the United States and the Commonwealth of Virginia as may be

applicable. In the event of any litigation over the interpretation or application of any of the terms or provisions of this contract, DVP and the Contractor agree that litigation shall be conducted in the Commonwealth of Virginia.

14. **BINDING EFFECT/AMENDMENTS.** This contract shall become binding when signed by the parties. This contract supersedes all prior or contemporaneous communications and negotiations, both oral and written and constitutes the entire contract between the parties relating to the work set out above. No amendment shall be effective except in writing signed by both parties.

15. **SEVERABILITY.** If any provision of this contract is held invalid, the other provisions shall not be affected thereby.

16. **NO THIRD PARTY BENEFICIARY.** This contract shall not be construed to create any third party beneficiary rights.

IN WITNESS WHEREOF, the Contractor and DVP have executed this contract, effective as of the last date written below.

VIRGINIA DEPARTMENT OF CONSERVATION AND RECREATION

By: Thomas L. Smith
Print Name
Authorized Representative

Thomas L. Smith
Signature

Title: Natural Heritage Director

Date: 15 April 2011

DOMINION VIRGINIA POWER

By: Robert B McKinley
Print Name
Authorized Representative

Signature

Title: VP. Generation Construction

Date: April 11, 2011

Exhibit 1

Budget Estimate from Virginia Division of Natural Heritage

Dominion Energy Warren County Power Station
Project Set-up and Monitoring Plan Development

Instrumentation

Item	Number	Price	Cost		
HOBO U20 Water Level Data Logger - U20-001-02 100-Foot Depth	3	495	1485		
HOBO® Conductivity Data Logger - U24-001	3	699	2097		
HOBO® Waterproof Shuttle - U-DTW-1	1	230	230		
Hoboware Pro BHW-PRO-CD	1	99	99		
Instrumentation Subtotal				$	3,911.00

Other Equipment

Rigging and Mark-recapture study supplies	$	500.00

Personnel

		Days	Staff	Rate				
Evaluation								
	- Field days	3	2	340	$	2,040.00		
	- Office days	3	1	340	$	1,020.00		
Development of Monitoring Plan (including QA/QC)								
	- Office days	4	1	340	$	1,360.00		
Installation of Monitoring Apparatus		3	2	340	$	2,040.00		
Personnel subtotal							$	6,460.00

Travel

Mileage (4 trips at 500 miles @ $0.50/mi)	$	1,000.00		
Perdiem (12 field staff days * $41/day)	$	492.00		
Lodging (joint occupancy; 4 nights at $80/night)	$	320.00		
Travel Subtotal			$	1,812.00

Subtotal	$	12,683.00
Division of Natural Heritage Indirect (11.36%)	$	1,440.79
Total Project Cost	**$**	**14,123.79**

Year-one monitoring - Madison Cave Isopod

Personnel	Days	Staff	Rate				
Annual population estimate (mark-recapture)	6	2	340	$	4,080.00		
Quarterly Download and Maintenance of Monitoring	6	2	340	$	4,080.00		
Preparation of Annual Report	4	1	340	$	1,360.00		
Personnel subtotal						$	9,520.00

Travel

Mileage (6 trips at 500 miles @ $0.50/mi)	$	1,500.00		
Perdiem (24 field staff days * $41/day)	$	984.00		
Lodging (joint occupancy; 6 nights at $80/night)	$	480.00		
Travel Subtotal			$	2,964.00

Subtotal	$	12,484.00
Division of Natural Heritage Indirect (11.36%)	$	1,418.18
Total	**$**	**13,902.18**

* - one event will be done in conjunction with mark-recapture study

Total	28,025.97