Herpetological Associates, Inc. - Environmental Consultants

❀ Plant and Wildlife Specialists ❀

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August 10, 2010

Joseph A. Del Duca, Esq.
Partner and General Counsel - Walters Group
500 Barnegat Blvd. North - Building 100
Barnegat, New Jersey 08005

Re: Evaluation of the Proposed Solar Panels on Native Wildlife at Stafford Park Landfill Site in Stafford Township, Ocean County, New Jersey - HA File Number 2006.19-SP.

Dear Mr. Del Duca:

As requested, Herpetological Associates, Inc. (HA) has conducted an intensive inspection of the recently capped licenced landfill at the Stafford Park Re-Development Site (hereafter SPR property). Our mission was to evaluate potential impacts to wildlife from the installation of 1,026 solar collection panels. The inspection and evaluation was conducted by me, on July 7 and 15, 2010 at the landfill. Additionally, I attended a meeting at the Pinelands Commission office on July 19, 2010, to discuss the solar panel project with Commission staff and scientist. I also read and studied various plans and detailed drawings of the solar panels as part of HA's review of the proposed project. Because our staff botanist, Ted Gordon was away on vacation, another qualified New Jersey botanist, Joseph R. Arsenault - Environmental Consulting was commissioned to help assess the potential impacts of the proposed solar panels on the various warm season grasses and vegetation which currently covers approximately 85% of the landfill and surrounding areas. Mr. Arsenault will submit his report under separate cover.

Introduction and Project History

In accordance with the June 28, 2006, *Memorandum of Agreement* (MOA) between Walters Homes, Inc. (hereafter Walters), Stafford Township, Ocean County and the New Jersey Pinelands Commission (hereafter the Commission), Walters has completed the remediation of an old unlicensed landfill, and the environmental capping and closure of a larger, licensed municipal landfill. Consistent with the MOA, Walters also constructed a mixed use commercial and residential development, known as the Stafford Business Park Redevelopment Project (hereafter SPR property). **Figure 1** shows a western view of the study site and the area with the licensed landfill in relation to the 370-acre SPR property. There are three rare wildlife species and two rare plant species known to occur at the SPR property. The state-endangered southern gray treefrog (*Hyla chrysoscelis*, the state-threatened, Pine Barrens treefrog (*Hyla andersonii*) and the northern pine snake (*Pituophis melanoleucus* - a state-threatened species) all occur on the Stafford Forge Wildlife Management Area and in the general vicinity of the SPR property (Zappalorti and Golden 2006).

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Figure 1. A 2007 aerial photograph showing a western view of the study site and the early stages of the commercial construction on the eastern and central portions of the site. The licenced landfill is centered on the western portion of the SPR property (highlighted with white lines), Retention Basin D is located at the extreme west of the site (highlighted in white), the three pine snake mitigation and management fields are due west of the site (outlined in red lines), and the perimeter exclusion drift fence that surrounds the SPR property (is also outlined with red lines). Source: Walters, Inc.

The two endangered and threatened plant species known from the SPR property are Knieskern's Beaked Rush (*Rhynchospora knieskernii*), a federally-threatened and state-endangered sedge, and Little Ladies'-tresses (*Spiranthes tuberosa*), a small, rare orchid on both the Pinelands Commission's list of protected plants and the NJDEP's plant list. **Figure 1** above shows the approximate location of the perimeter exclusion drift fence (highlighted in red lines), that surrounds the study site and the three pine snake mitigation and management fields (also highlighted in red), to the west of the SPR property. The new licensed landfill where the proposed solar panels will be erected is depicted with white stippled lines and Retention Basin D is just west of the landfill, at the top of the photo. The breeding pond for southern gray treefrogs was placed in a portion of Retention Basin D.

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The capped landfill and surrounding area is 54-acres (21.8-hectares) in size, however 18-acres (7.2-hectares) of the land is currently being used by Ocean County for composting and recycling of leaves and vegetation debris. Additionally, there are five stormwater retention/detention basins with sand bottoms along the edges of the landfill area, which encompass about 5-acres (2.2-hectares) and the steep slopes of the basins occupy another 6.0-acres (2.4-hectares). Therefore, only a portion of the flat grassy surface of the landfill, approximately 25-acres (10.2-hectares), is proposed for solar panel construction and installation.

At the request of Alfred Galvan, Erosion Control Specialist with the Ocean County Soils Conservation District, rye grass was planted on various portions of the 54-acre landfill. This included 6.0-acres of slopes and other bare ground to prevent erosion of the soil. However, after consultation with Ted Gordon, HA's botanist, John Bunnell, Research Scientist at the Pinelands Commission, Ken Carter, Supervising Environmental Specialist at the Pinelands Commission and the Pinelands Preservation Alliance, Walter's decided to modify their assorted grass seed mixture to include only native Pine Barrens grass species on the landfill and the three snake management fields (on Stafford Forge Wildlife Management Area), and on the SPR property. The initially chosen and recommended grass seed mixture was as follows:

35% *Panicum virgatum*
25% *Andropogon virginicus*
25% *Schizachyrium scoparium*
15% *Sorghastrum nutans*

On July 10, 2007, the Pinelands Commission submitted a letter to Stafford Township's Mayor, Carl W. Block, approving the above mentioned grass seed mixture. Unfortunately, the commercial availability of the needed amount of *Andropogon virginicus* was not available. Both HA and Shoreline Grading, exhausted all possibilities to find the four seed species in a sufficient amount and within the appropriate window of time (Ocean County Soil Conservation District wanted the fields and landfill to be seeded by February 2008). HA contacted several nurseries and specialty wild grass seed companies in attempt to find the four recommended seed species (preferably NJ coastal plains genotypes). Subsequently and with the approval of NJDEP, the landfill and the three snake management fields were all planted with only three of the Pinelands Commission's recommended native grass species that were commercially available at the time. These were:

45% *Panicum virgatum*
35% *Schizachyrium scoparium*
20% *Sorghastrum nutans*

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Description of Existing Conditions

As of August 2010, there are numerous warm season grasses and other native vegetation currently growing on the licensed landfill. These grasses include *Panicum virgatum*, *Schizachyrium scoparium* and *Sorghastrum nutans*, which were planted by Walters in 2007 and 2008. These native grasses (and an assortment of other plant species - see Joseph R. Arsenault's report for a complete list of plants), cover approximately 80 to 85 % of the licensed landfill. Evidently, the selected seed mixture that was planted in 2007 and 2008, neither compromised additional native grass colonization, nor its growth on the landfill. More importantly, the rich grasses and native plants currently growing on the landfill have stopped soil erosion. There is some native *Andropogon virginicus* growing on the landfill and on the snake management fields through natural colonization. **Figure 1** illustrates a western view of the perimeter exclusion drift fence that surrounds the landfill and the locations of the three pine snake management fields. **Figure 2** shows the area where the solar panels will be installed and Retention basin D, in relation to the licensed landfill. Under separate cover, Joseph R. Arsenault will submit a more detailed list of plant species growing on the landfill in his report.

Description of the Proposed Solar Panels

The proposed 1,026 solar collection panels will be erected and positioned to run from east to west for optimal sun-light exposure. This will maximize the efficiency of the solar panels to generate electricity. A typical solar panel is 27 feet wide and 16 feet long. The low end of the panel is about 4 feet 3 inches above grade, and the high end is about 12 feet 6 inches above grade.

Each solar panel will sit on two concrete foundations that are 14 feet long and 2 feet wide. There is a 20 foot space between the rows of solar panels which will allow for general maintenance and mowing grasses. Mowing will also prevent unwanted trees from growing between the solar panels. All connecting wires will be run above ground and overhead. There will be no excavation into the soil on the landfill surface.

The entire installation of 1,026 solar collection panels will have an 8-foot high fence, since there is live electricity in the system. The chain-link fence will also provide safety and help keep vandals away from the site. Additionally, no solar panels will be constructed on the steep slopes or near the forest edge. Every panel can be accessed for general maintenance or repair, but it will not be necessary to check each panel on any scheduled basis. During construction of the ballasts, only a total of 1.3-acres of vegetation will be eliminated from the 25-acre top of the landfill. Ocean County already has solar panels, albeit somewhat smaller than the ones Walters' plans to install. These are located near their stormwater basin which is adjacent to the landfill. There appears to be little affect on grasses and other vegetation from these existing solar panels.

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Evaluation of the Possible Impacts of the Solar Panels on Wildlife

As stated above, there are three state-listed reptiles and amphibians and two rare plant species known to occur on the SPR property and surrounding areas. These are the endangered southern gray treefrog, the state-threatened, Pine Barrens treefrog and the state-threatened northern pine snake, which also occurs on the Stafford Forge Wildlife Management Area, as well as on the SPR property and general vicinity of the licensed landfill. The two plant species are Knieskern's Beaked Rush, a federally-threatened and state-endangered sedge and Little Ladies'-tresses, which is an orchid on the Pinelands Commission's list of protected plants. None of these above mentioned plants or animals occur on the approximate 25-acres (10.2-hectare), flat grassy surface of the landfill.

The rare plants have all been trans-located within protected areas on the SPR property (see HA File No. 2006.19-C, Pinelands Application No.1987-1159.032 that was submitted January 30, 2009, "Second Annual Progress Report on Transplanted Populations of Knieskern's Beaked Rush and Little Ladies'-tresses in 2008 at the Stafford Business Park, Ocean County, New Jersey," for details on the transplantations). The addition of solar panels will have no impact upon these rare plants because their new locations are not on the licensed landfill.

In 2006, HA recommended that only native grasses approved by the Commission be planted on the landfill, such as Pennsylvania sedge, switch grass and broom sedge. Walters obtained the root stock of these grasses by collecting the plants and top-soil humus that existed on the property with a front end loader and dump trucks. Some non-native plant species were also inadvertently collected during the process. The material was stockpiled and stored on site. Once the licensed landfill was complete and the top cap-liner was installed, the stockpiled earth material was spread-out equally over the surface, thus providing the root stock of the desired native grasses and plants. Unfortunately, some invasive, non-native plants were mixed-in with the top soil that was spread on the landfill, but this was not intentional. The open landfill area was also planted with 45% *Panicum virgatum*, 35% *Schizachyrium scoparium* and 20% *Sorghastrum nutans*. Native grasses are preferred because they are low maintenance, do not require irrigation or fertilizers, are drought tolerant and they prevent soil erosion.

Although the licensed landfill may never be valuable habitat for any wildlife species, once the grass roots reach deep into the soil, their upright growth will provide cover which may encourage foraging by small mammals and some birds. Grass seeds serve as a natural wildlife food resource. Since 2008 and 2009, these grasses have grown and became established on the landfill. These grasses and shrubs have stabilized the soil and provide suitable feeding areas for a variety of insects, birds and mammals. Some rodents, such as red-backed voles, meadow voles and white-footed mice have been captured or observed along the edges of the forest and field habitat (e.g., rodents identified when caught in the perimeter drift fence traps).

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Evaluation of the Landfill as Grassland Bird Habitat

While HA did not conduct an intensive bird survey on the SPR, several common species of birds have been seen and noted over the past four-years, such as common crow, fish crow, common grackle, starling, cat bird, robin, herring gull, laughing gull and red-tailed hawk. Because of the early growth stages of the grasses and other plant species on the landfill, the area is only marginal habitat and should not be considered ideal for any threatened and/or endangered grassland bird species. Over the past three-growing seasons the only two nesting bird species confirmed on site by HA staff were the killdeer (*Charadrius vociferus*) and the horned lark (*Eremophila alpestris*). The horned lark is a species of special concern in New Jersey. Both species of birds seek open patches of bare, sandy ground interspersed with grasses in which to nest, especially the horned lark.

New Jersey's state listed species such as savannah sparrow (*Passerculus sandwichensis*), grasshopper sparrow (*Ammodramus savannarum*) and bobolink (*Dolichonyx oryzivorus*) have not been seen feeding, resting or nesting on the landfill or anywhere within the Stafford Park Re-Development Site. According to Wheelwright and Rising (1993), and Vickery (1996), these rare grassland bird species typically select large open grassy meadows and farm-field habitats with a "patch-size" of 30 to 100 hectares (74 to 247-acres). Since the flat surface of the landfill covers an area of approximately 25-acres (10.2-hectares), it is too small to be considered important grassland bird habitat.

What seems to be essential to these grassland birds when selecting nesting habitat are grass species that provide vegetative cover while growing far enough apart to maintain some open bare soil patches (depending on the bird species). Such habitat is often created by farmers as they leave individual fields fallow or plant crops such as hay (Sibley 2000).

Grasshopper Sparrow (State Status: Threatened)

Grasshopper sparrows generally prefer moderately open grassland and prairie habitat with patchy bare ground (Vickery, 1996). They inhabit well-drained native and farmed grasslands in the eastern United States. This species favors larger fields over smaller more fragmented sites. According to the literature, 30 to 100-hectares (74 to 247-acres) is the typical patch size of grasslands where grasshopper sparrows nest. Grasshopper sparrows were once found in smaller natural clearings in the early 1900's when they were much more common. Therefore the approximate 25-acres (10.2-hectares) of the licenced landfill does not meet the general patch size requirements necessary in order to serve as grasshopper sparrow nesting habitat. Only marginal grassland bird habitat presently exists on the landfill, and these conditions are not likely to change with the installation of solar panels.

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Savannah Sparrow (State Status: Threatened)

Savannah sparrows generally occupy grassy meadows, cultivated fields, lightly grazed pastures, roadsides, coastal grasslands, sedge bogs, edge of salt marshes and tundra during the breeding season (Wheelwright and Rising, 1993). Dense, grassy ground vegetation is generally preferred. Hay fields are generally suitable as nesting habitat for the savannah sparrow. This species sings frequently upon returning from spring migration and arriving on the nesting territory. Singing males are conspicuous as they fly between favored song perches. Agonistic interactions between neighboring nesting pairs are common while birds are on territory. Only marginal grassland bird habitat presently exists on the landfill, and these conditions are not likely to change with the installation of solar panels.

Bobolink (State Status: Threatened)

Bobolink prefers hay fields and meadows comprised of a mixture of grasses and broad leaved forbs (Martin and Gavin, 1995). Breeding bird densities are generally higher in older hayfields that have not been plowed or re-seeded in > 8 years (Bollinger and Gavin, 1992). In addition, densities are twice as high in fields > 30 hectares (74 acres) than in fields < 10 hectares (25 acres). The existing landfill located on the Stafford Park Re-development site is only approximately 25-acres (10.2-hectares). Therefore, the landfill in its current vegetative condition does not meet the general size and habitat structure requirements necessary to serve as bobolink nesting habitat. Only marginal grassland bird habitat presently exists on the landfill, and these conditions are not likely to change with the installation of solar panels.

Evaluation of the Landfill as Habitat for Northern Pine Snakes and Other Wildlife

Because there will be live electricity being generated by the solar panels, Walters proposes to install an 8 foot high chain-link security fence around the facility for public safety and to keep vandals away from the site. Therefore, security and safety are the only intended purposes of the proposed chain-link fence. It is HA's opinion that the capped licensed landfill is only "marginal wildlife habitat," at best. Whether or not the solar panels are installed and a fence is constructed, the licensed landfill will remain marginal habitat for northern pine snakes, due to the existing scarcity of ground cover and limited prey that currently lives there. If installed, the fence will not impede entry of pine snakes and some other wildlife into the solar panel area. The solar panels and the security fence will have minimal impacts on northern pine snakes and other wildlife, because they will not be a barrier. The installation of the solar panels and perimeter fence may actually have some benefits for pine snakes. As the grasses continue to grow and small mammals and rodents move onto the landfill, northern pine snake may be attracted to the area to forage.

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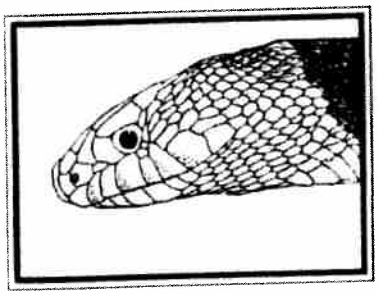
It has never been the intention of Walters or HA to encourage northern pine snakes to use the landfill as habitat. However, the security fence will not impede entry of pine snakes, small rodents and mammals onto the landfill. Similarly adept climbers such as opossum (*Didelphis marsupialis)* and raccoon (*Procyon lotor*), will also be able to access the solar panel area if they choose to do so. It's possible that the fence and solar panels may likely have some unintended benefits for pine snakes.

Specifically, the fence will keep larger predatory mammals, such as coyote (*Canus latrans*), red fox (*Vulpes fulva*), gray fox (*Urocyon cinereoargenteus*), and striped skunk (*Mephitis mephitis*), out of the area acting as a barrier. Additionally, the solar panels will likely provide cover for pine snakes from flying predators such as red-tailed hawks (*Buteo jamaicensis*) by obscuring their line-of-sight vision from above. The solar panels will provide shading and cover from attacks by red-tailed hawks.

Additionally, the proposed fenced solar panel area will remain available to some smaller predatory mammals and reptiles, such as long-tailed weasel (*Mustela frenata*), short-tailed shrew (*Blarina brevicauda*), and the eastern king snake (*Lampropeltis getula*), which are all known to kill and eat snakes. The small size of these above mentioned species will enable them to walk or crawl through the openings of the chain-link fence. No plastic netting should be used anywhere on the fence or around the solar panel area as it can be a hazard to snakes and other wildlife (Stuart et al, 2001). Whatever animals that happen to go into the solar panel fenced area, should be able to leave the area just as easily and without any obstructions.

HA has learned that not only are coyote, fox, skunk and raccoon potential predators to pine snakes in the wild, but red-tailed hawks will relentlessly attack, kill and eat them if and when the opportunity arises (Zappalorti et al, 2007 and 2008). Still, pine snakes can avoid these predators by remaining hidden for long periods of time or by crawling through their habitat under the concealment of thick brush, shrubs and tall grasses. The pine snakes even move underground through mole tunnels to avoid hawks and other predators on the surface (Zappalorti et al, 2007 and 2008).

Like the pine snakes, predators will only go where their food resources are concentrated and it is not likely that the enclosed solar panel area will have high concentrations of prey animals. On the other hand, pine snakes are capable of avoiding predators and some research has been done on this subject. Conducting experiments in her laboratory, Dr. Joanna Burger (1989 and 1990), has shown that pine snakes will avoid predators if they pick-up their chemical scent odors. Moreover, neonate, juvenile and adult snakes have the ability to safely follow the scent trail of conspecifics (Burger 1989 and 1990; Reinert and Zappalorti 1988a and 1988b).



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In general, the construction of the solar panels and the security fence will have little impact on the wildlife that may eventually access it. Clearly, population densities and distribution of all wildlife including northern pine snake, will be more concentrated in the Stafford Forge WMA forest and the Mill Creek wetland corridor as compared to the landfill area. There will be some wildlife activity due to the grasses that will continue to grow on the landfill, but the installation of solar panels and a security fence will have little to no impact on these wildlife species.

The chain-link fence around the licensed landfill will not be a barrier to pine snakes, small mammals such as rodents, moles and shrews, along with an assortment of passerine birds and a whole host of insects. The grassy field, albeit with solar panels on it, may eventually attract some wildlife, especially given the fact that the perimeter exclusion drift fence will be removed in the fall of 2010.

Construction Schedule — Maintenance of Solar Panels and Grasses

Walters plans to start preparation work and erecting the solar panels on or about December 1st, 2010. It is anticipated that the construction process will be done in three phases. Each phase will take the contractors approximately 60 to 120-days to complete the solar panel construction, including erecting the chain-link fence and gates. If construction is done during the winter months when pine snakes are in hibernation (November through March), then an environmental inspector/herpetologist would not be needed. Construction work could proceed without delay on December 1st, 2010, within the winter months. If Walters engages in installation during the warm months of April to October, then to be safe, HA should be on site to assure that there are no negative impacts to northern pine snakes or any other animal species.

Once the installation of 1,026 solar panels on the licensed landfill is completed, it will require very little on-going maintenance. Technicians will conduct periodic inspections of the solar equipment to ensure that the panels are operating to full capacity, but beyond that maintenance is minimal. Maintenance is especially limited since the panels are stationary and lack moving mechanical parts.

On the other hand, the grasses will require annual mowing. HA recommends that the areas within and outside of the chain-link fence, and the landfill in general should be mowed only once every year, and during the winter months (November - March). This will keep the grassy habitat in an early successional field (e.g., to keep trees and shrubs from growing). It will remain Walters' obligation to maintain the grasses on the surface of the landfill, which may provide some marginal habitat for birds and other wildlife in the future.

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Figure 2. A 2010 aerial photograph showing the approximate locations of the proposed solar panel area on the licenced landfill (the area highlighted with white lines), Retention Basin D (the white area at the extreme top of the photo), the perimeter exclusion drift fence (shown by the red line around the edge of the property), and the existing commercial and residential development areas. The Garden State Parkway can be seen along the bottom of the picture. Source: Walters, Inc.

Figure 2 above, shows a western view of the Stafford Park Re-development property and the licensed landfill. North is to the right of the photograph and South is to the left. The southbound lane of the Garden State Parkway can be seen at the bottom of the picture for orientation. It should be noted that for the past four-years the entire landfill and the SPR property have been surrounded by a perimeter drift fence (which is shown by the red lines around the property). That was installed to keep wildlife in general, and pine snakes in particular, off the construction area and out of harm's way. The rationale and details of the excluder fence are provided below.

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The Existing Pine Snake Perimeter Drift Fence

For the past four-years the SPR and landfill have been surrounded by a perimeter drift fence totaling approximately thirteen thousand (13,000) feet (Zappalorti and Torocco 2002). HA has been monitoring and maintaining the drift fence since 2006. Snake traps were kept on both sides of the fence for two years to capture pine snakes that may be leaving or entering the SPR construction area. It was predicted that most snakes would be collected or displaced from the SPR by the end of year two. After 2008, traps were placed only on the outside of the drift fence to keep snakes off the landfill for the remaining two years (2010). The perimeter fence was repaired and kept functional during the 4-year on-going drift fence trapping study. The traps are checked every 48 hours during the snakes active season (April through October). Any new adult pine snakes caught in the perimeter fence traps were fitted with radio-transmitters (up to 10 snakes), and monitored for the remainder of the investigation. Hatchlings and juveniles caught in the traps (or by random searching), are injected with Pit Tags as part of the mark and recapture program (Zappalorti and Golden 2006).

The large drift fence has 126 box funnel traps attached to it. The fence traverses various habitat types in an attempt to capture free-ranging pine snakes. This trapping method was used in conjunction with the visual sampling techniques to increase the chance of capturing pine snakes. The perimeter drift fence is also meant to exclude pine snakes and other wildlife species from entering the SPR and landfill property. The drift fence was constructed of black nylon silt fence, three feet in height and is supported with oak stakes. Approximately five inches of the fence material is buried below grade level, thereby preventing snakes from crawling under the fence. A small hole (approximately four inches in diameter) was cut into the fence material at the ground surface and a box funnel trap was connected to the hole, thus providing a place for snakes to crawl through the fence and become trapped (Zappalorti and Golden 2006).

Each box trap measures approximately three feet long, one foot high and one foot wide. The traps were constructed from treated plywood and 1/4 inch mesh galvanized hardware cloth. Each trap has one plastic funnel placed with its wide end attached to the end of the trap and the narrow end extending into the trap. A hinged lid with latches allows easy access for snakes to become trapped. The snake traps work on a principle similar to that of a minnow trap, where fish (and in this case, snakes) are able to enter the trap, but have great difficulty in finding their way out. Leaves are placed in each trap to provide a cool, moist retreat for trapped animals. A plywood shade-board is placed over the top to provide shade and reduce exposure to the sun (Zappalorti and Torocco 2002).

It is important to note and to understand that the excluder drift fence will be removed in November of 2010, thus giving pine snakes and other wildlife free access to the SPR property and the licenced landfill in the 2011 spring season.

Pine snakes and other wildlife may eventually find suitable areas on the SPR property to forage, eat and seek shelter (Burger and Zappalorti 1988 and 1989). However, unless searching for a nesting area (Burger and Zappalorti 1986 and 1991), HA has learned that pine snakes will not use open, bare sandy areas as travel corridors, because that exposes them to predators on the surface such as red-tailed hawks, foxes and coyote. In order to avoid these predators they will select vegetated or grassy habitat to safely travel from one part of their habitat to another. The grasslands on the licenced landfill will attract many insects, birds and small mammals. Pine snakes may eventually forage for prey in the grasslands as well as in the forest of Stafford Forge Wildlife Management Area. The installation of solar panels will not have an adverse impact upon the pine snake population for all the reason cited above.

Southern Gray Treefrog Mitigation Pond

As part of the mitigation and management of rare species, Walter's constructed a southern gray treefrog breeding pond in a portion of Retention Basin D. The basin is located in the northwest corner of the landfill. Only rainwater enters the breeding pond and other retention basins. This site was chosen because adult treefrogs were heard calling in the close vicinity of Basin D in May of 2008. The breeding pond was constructed in the Fall of 2008, so it was available as a breeding site for the treefrogs in the Spring of 2009. This pond was part of the mitigation plan to replace the lost breeding habitat for southern gray treefrogs from construction of the Stafford Business Park. Monitoring in the Spring of 2009 and 2010 has shown this pond is extremely successful in attracting calling male southern gray treefrogs. Although we did not see any pairs of treefrogs in the actual mating position (amplexus), during the survey nights, eggs were evidently deposited.

On July 31, 2009, tadpole activity was observed within the flooded Retention Basin D and the breeding pond by Robert Zappalorti, Robert Hamilton, and Robert Fengya, Jr. Several dozen tadpoles of southern gray treefrogs and Fowler's toads were observed surfacing for air in the late afternoon. Tadpole activity was concentrated both in the center and edges of the pond.

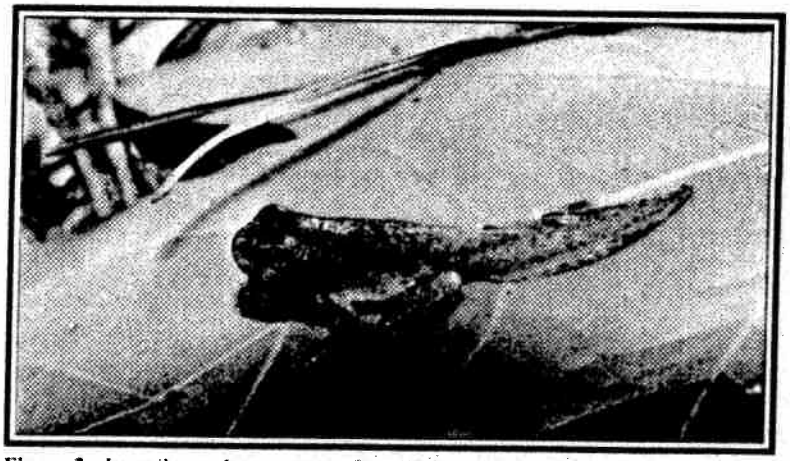

Figure 3. Juvenile southern gray treefrog (*Hyla chrysoscelis*), in the later stages of metamorphosis. This was one of many observed in this stage of development by HA staff in 2009 and 2010 in the breeding pond and in other retention basins. Photograph by Robert J. Hamilton, Herpetological Associates.

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The presence of southern gray treefrogs on the edge of the pond over the last two-years demonstrates important use of this created habitat. No Pine Barrens treefrogs have been seen or heard calling on the SPR property. However, it appears that southern gray treefrogs have re-established themselves at several locations on the SPR area. The proposed installation of solar panels on the landfill will not have an adverse impact upon the southern gray treefrog population.

Summary and Conclusion

After careful review, it is HA's professional opinion that the construction, installation and on-going operation of 1,026 solar panels on the licensed landfill is compatible with the wildlife on site. The solar panels will not have any direct or secondary adverse impacts upon the pine snakes, treefrogs or two rare plant species known to occur in the vicinity of the SPR property and the landfill.

Sincerely Yours,

Robert T. Zappalorti

Robert T. Zappalorti
Executive Director/President

HERPETOLOGICAL ASSOCIATES, INC.

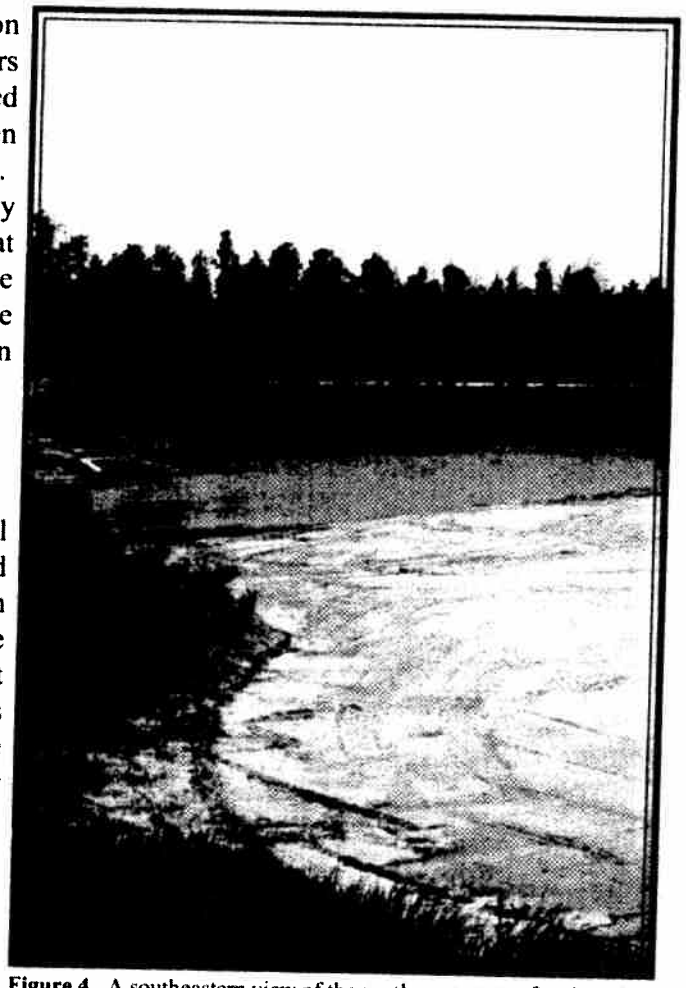

Figure 4. A southeastern view of the southern gray treefrog breeding pond within Detention Basin-D. Notice the various native grasses growing on the steep slopes of the basin which include broom sedge, Pennsylvania sedge and switch grass. Southern gray treefrogs and Fowler's toads have bred in the lined mitigation pond in 2009 and 2010, thus demonstrating the value of providing artificial wetlands for amphibians.

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