December 8, 2010

CERTIFIED MAIL

Kristin Black
Natural Heritage & Endangered Species Program
MA Division of Fisheries & Wildlife
Route 135/North Drive
Westborough, MA 01581

Re: NHESP File #08-26003 [LEC File#: WP\09-012.01]
Town of Orleans
Comprehensive Wastewater Management Plan
Orleans, Massachusetts

Dear Ms. Black:

On behalf of the Applicant, the Town of Orleans (c/o George Meservey, Planning Director), LEC has prepared the following supplemental information to assist the Natural Heritage and Endangered Species Program (NHESP) with review of the Town of Orleans' Comprehensive Wastewater Management Plan (CWMP). The CWMP consists of a proposed municipal sewer system, pumping stations, small wastewater treatment systems (cluster sites), and a primary wastewater treatment facility at 29 Overland Way in Orleans, Massachusetts. In response to a MESA Project Review Application and concept plans (Figures 1-4, dated Nov. 2008), NHESP issued a letter on January 8, 2009, stating that the existing Tri-Town Septage Treatment Facility is located within Priority Habitat for the Eastern Box Turtle (*Terrapene carolina*), Diamond-backed Terrapin (*Malaclemys terrapin*), Salt Reedgrass (*Spartina cynosuroides*), and Mitchell's Sedge (*Carex mitchelliana*). In order for NHESP to continue project review under the *Massachusetts Endangered Species Act* (MESA, M.G.L. c. 131A) and its implementing *Regulations* (321 CMR 10.00), an Eastern Box Turtle Habitat Assessment was requested for the property. Consequently, LEC was retained and a site evaluation was conducted on February 11, 2009, to document existing habitat cover types in relation to potential *T. carolina* habitat.

On April 14, 2009, LEC submitted a *Terrapene carolina* Habitat Assessment report to NHESP. The report provided a description of the treatment facility's existing site conditions, *T. carolina* habitat analysis, and impact assessment in conjunction with a *Terrapene carolina Habitat Cover Type Map* prepared by LEC and dated April 3, 2009. At the time, the Town was reviewing several alternative site layouts for the proposed wastewater treatment facility. Accordingly, Wright-Pierce (Project Engineer) prepared four figures representing the varying alternatives (Figures 1, 2, 3, and 4). The Habitat Assessment Report provided specific details on the four alternative site layouts.

Following preliminary review, Brian Madden (LEC) and Heather Merriman (Wright-Pierce) met with you on April 23, 2009, to discuss the varying alternatives and corresponding state-listed rare species concerns at the Tri-Town site in advance of filing an Expanded Environmental Notification Form (EENF) with the Massachusetts Environmental Policy Act (MEPA) Office. The EENF was published in the Environmental Monitor and a Certificate was issued on July 10, 2009, indicating that while the project requires the preparation of an

Environmental Impact Report (EIR), a Single EIR (SEIR) may be submitted in fulfillment of Section 11.03 of the MEPA Regulations.

The following provides updated details on the CWMP that address the EENF comments received by NHESP in a letter dated June 24, 2009 and the comments issued by MEPA in the EENF Certificate. Specifically, the Town has selected a Recommended Layout (Figure 11-2, Dec 2010) that avoids, minimizes, and mitigates impacts to *T. carolina* at the Tri-Town site. As redesigned, LEC believes the project can be conditioned to avoid a "take" of *T. carolina*.

General Site Description

The 26± acre Tri-Town site is located southeast of the Namskaket Creek Salt Marsh at the terminus of Overland Way within a mixed residential/commercial/industrial portion of Orleans, Massachusetts. The property is bounded by Route 6 to east, residential/commercial/industrial development to the south, radio towers to the west, and the Cape Cod Rail Trail (bike path) to the west and north. The site itself is currently improved by the existing Tri-Town Septage Treatment Facility, comprised of a primary maintenance/office building, smaller maintenance buildings, various storage and treatment tanks, eight effluent disposal (infiltration) basins, paved access roads, and associated parking areas. The existing facility, enclosed by chain-linked fencing on three sides (west, north, and east), is accessed from Overland Way, via a gated, paved roadway extending northerly into the site and eventually terminating at an abandoned compost shed. Currently, a dilapidated wooden stockade fence extends through the southern portion of the site, partially abutting developed conditions. Remaining portions of the property are primarily occupied by undeveloped forested upland and wetland areas.

On-Site Habitat Conditions

Forested Upland

Forested upland conditions occur south and east of the existing facility and west of the paved entranceway. The moderately dense canopy is dominated by pitch pine (*Pinus rigida*), scarlet oak (*Quercus coccinea*), red oak (*Q. rubra*), and white oak (*Q. alba*), along with scattered individuals of black cherry (*Prunus serotina*), eastern white pine (*Pinus strobus*), red maple (*Acer rubrum*), sycamore maple (*Acer pseudoplatanus*), gray birch (*Betula populifolia*), and black locust (*Robinia pseudoacacia*). Density of the shrub layer varies across the site, ranging from fairly sparse to dense thickets with common greenbrier (*Smilax rotundifolia*) entanglements. Scattered sassafras (*Sassafras albidum*) saplings and small patches of black huckleberry (*Gaylussacia baccata*) occur sporadically throughout the understory, in addition to clusters and individuals of highbush blueberry (*Vaccinium corymbosum*), bayberry (*Myrica pensylvanica*), arrowwood (*Viburnum dentatum*), tartarian honeysuckle (*Lonicera tatarica*), and poison ivy (*Toxicodendron radicans*). Seedlings from the canopy and shrub layer dominate the groundcover with scattered tufts of Pennsylvania sedge (*Carex pensylvanica*). These forested upland conditions are fairly typical of the oak/pine natural communities found across Cape Cod.

Mild, rolling topography characterizes the forested upland. Various dirt/earthen woods trails traverse throughout the forested upland areas. In total, forested upland habitat covers approximately 13.1± acres of the site as depicted on the *Terrapene carolina Habitat Cover Type Map*.

Forested Wetland Areas

Forested wetland conditions occupy the southwestern portion of the site. Red maple trees dominate the moderately dense canopy with scattered individuals of tupelo (*Nyssa sylvatica*), pussy willow (*Salix discolor*), and various oaks. The shrub layer is primarily comprised of sweet pepperbush (*Clethra alnifolia*), arrowwood, and highbush blueberry. Cinnamon fern (*Osmunda cinnamomea*), sensitive fern (*Onoclea sensibilis*), skunk cabbage (*Symplocarpus foetidus*), and mats of sphagnum moss (*Sphagnum* spp.) occupy portions of the groundcover with seedlings from the canopy and shrub layer. Common greenbrier entanglements are also prevalent throughout the BVW.

A system of excavated, linear ditches occupies the interior of the wetland system. A small, ephemerally flooded depression containing elevated, vegetated hummocks is located within the BVW northwest of the paved entranceway. Based on water marks and staining, the interior of the forested wetland may hold between 0-8" of standing water following snow melt and during the spring hydroperiod.

The westernmost corner of the wetland system transitions to a fringing emergent marsh system dominated by common reed (*Phragmites australis*). This brackish wetland area receives tidal exchange from an unnamed creek extending underneath the Cape Cod Rail Trail via a buried culvert.

In total, wetland areas cover approximately 4.5± acres of the site (4.0± acres Forested Wetland and 0.50± acres Emergent Marsh).

Developed Conditions

Based on aerial interpretation and field reconnaissance, existing developed conditions, comprised of access roads, parking areas, structures, disposal/infiltration basins, and surrounding lawn/landscaped areas, occupy approximately 8.4± acres of the site. While the embankments along the main entranceway are dominated by ornamental juniper (*Juniperus* spp.) plantings, a variable mix of native and invasive species immediately abuts developed conditions, including, but not limited to, multiflora rose (*Rosa multiflora*), common blackberry (*Rubus allegheniensis*), autumn olive (*Elaeagnus umbellata*), tree-of-heaven (*Ailanthus altissima*), black locust, tartarian honeysuckle, poison ivy, common greenbrier, sweet fern (*Comptonia peregrina*), staghorn sumac (*Rhus typhina*), and various goldenrods (*Solidago* spp.).

Currently, eight disposal/infiltration basins are located within southeastern portion of the developed Tri-Town Septage Treatment facility. Each basin contains a centrally-located concrete column with four steel arms that allow dispersion of effluent across the bottom of the basin. The basins are surrounded by maintained lawn conditions and grassy/earthen access roads utilized for maintenance purposes. Documented herbaceous species within and immediately abutting the basin include Pennsylvania sedge, goldenrods (*Solidago* spp.), asters (*Aster* spp.), little bluestem (*Schizachyrium scoparium*), switchgrass (*Panicum virgatum*), round-headed bush clover (*Lespedeza capitata*), and chicory (*Cichorium* spp.). Additionally, one basin is dominated by common reed. Small, scattered sandy openings occur within the access roads and along the basins' earthen slopes. A paved access road, extending northerly from the terminus of Bay Ridge Lane (gated), and a row of eastern white pine trees occur along the eastern perimeter of the basins' footprint.

Off-Site Habitat Conditions

Adjacent undeveloped habitat cover types surrounding the site primarily consist of forested upland and wetland areas, including emergent marsh, wet meadow, and a salt marsh system.

Forested Upland

Considering the presence of Route 6 and moderately dense commercial development off Route 6A, forested upland conditions south of the site are primarily small, isolated, and fragmented. North of the site and the Cape Cod Rail Trail (bike path), forested upland conditions dominate areas surrounding existing residential development. Vegetative composition and species diversity of off-site forested upland areas are generally consistent with the on-site habitat descriptions.

Wetland Areas

Areas west/southwest of the site are occupied by emergent marsh, wet meadow, and forested/scrub shrub wetland habitat. Vegetative composition and species diversity of off-site forested wetland and emergent marsh habitat are generally consistent with the on-site habitat descriptions. The wet meadow occupies the majority of the aforementioned radio tower property. Broom sedge (*Andropogon virginicus*), soft rush (*Juncus effusus*), various sedges (*Carex* spp.), sensitive fern, cattails (*Typha* spp.), and common reed occupy portions of the wet meadow.

The expansive Namskaket Creek Salt Marsh system occurs northwest of the site and is generally characterized as a typical New England high marsh with brackish-water transition zones primarily dominated by saltmarsh cordgrass *(Spartins patens)* and smooth cordgrass *(Spartina alterniflora)*.

Terrapene carolina Habitat Analysis

T. carolina populations found on Cape Cod occur within a wide variety of connected habitat cover types (e.g., oak/pine upland forests, forested red maple swamps, and open, successional field areas), frequently abutting residential, commercial, and industrial development. Mesic forest areas providing vertical stratification, structure, and plant species composition/diversity, offer adequate *T. carolina* habitat to favor "thermoregulation (of the turtle) by providing cool areas in summer and favorable habitats in which to overwinter" and functioning to "maintain higher humidity than surrounding open zones" (Reagan, 1974). *T. carolina* are not adverse to utilizing wet habitats, especially during drought periods in the summer months (Dodd, 2001), however, individuals typically prefer areas with varying habitat types in fairly close proximity, particularly favoring ecotones between habitats (Madden, 1975). The most favorable conditions for *T. carolina* include warm temperatures, high humidity, and frequent rains (Dodd, 2001, Stickel, 1950; Dolbeer, 1969). Thus, the forested upland and wetland areas immediately surrounding the existing Tri-Town Septage Treatment facility appear to function as viable *T. carolina* Feeding, Breeding, and Migratory habitat on the 26± acre site, constituting 17.6± acres of actual *T. carolina* habitat, albeit fragmented. Appropriate Overwintering Habitat is located throughout the undeveloped forested upland and majority of the forested wetland. Furthermore, areas immediately surrounding the disposal/infiltration basins may function as limited Nesting Habitat.

Forested upland areas containing a mix of oaks and pines posses an accumulated duff layer (leaf litter) and an adequate topsoil depth to thermally protect overwintering *T. carolina* individuals. Additionally, more terrestrial portions of the forested wetland may function as potential Overwintering habitat. Following brumation, the

entire site possesses the ability to function as Feeding, Breeding, and Migratory Habitat. Edge (ecotone) habitat surrounding existing developed conditions may be sought out for thermoregulation and feeding purposes upon emergence from brumation. All on-site wetland areas provide a cooler microclimate for thermoregulation during the hot summer months, while *T. carolina* individuals aestivate and/or replenish depleted water levels. The on-site habitat cover types also likely provide a sustainable food source for *T. carolina*, including fallen berries and seeds from the overstory and understory, in addition to various fungi/mushrooms that may exist on the forest floor. Furthermore, these habitats likely contain ample carnivorous prey species, including macroinvertebrates (i.e., slugs, snails, earthworms, spiders, isopods, caterpillars, beetles, crickets, etc.) and small amphibians (i.e., frogs, toads, and salamanders).

As noted above, Nesting Habitat appears to be limited on-site. While small, scattered sandy openings occur within the access roads and along the basins' upper slopes, potential Nesting Habitat is likely diminished by maintenance vehicles and equipment accessing the basins (soil compaction and direct disturbance). Furthermore, the interior of these basins are routinely dosed with effluent and cannot function as potential Nesting Habitat.

While the project site affords potential habitat cover types for *T. carolina*, it should be noted that the property offers low estimated population viability due to the on-site developed conditions and overall surrounding habitat landscape. As stated above, the site is bounded by Route 6 to the east, while residential, commercial, and industrial development exist directly to the south, partially abutting Route 6's westbound off-ramp. Additionally, the site is fragmented by existing developed conditions, including multiple buildings, a compost shed, driveways, parking areas, and Overland Way which is routinely utilized by heavy trucks for discharging septic waste. Should *T. carolina* be present on-site, migration activities to undeveloped habitat conditions to the north and west may be disrupted by the presence of the chain-linked fence partially encircling the existing Tri-Town Septage Treatment Facility. However, LEC did note sporadic gaps in the fencing that would not totally exclude migration off-site. Considering the size, fragmented nature, condition, and use of the property in the context of the surrounding habitat landscape, LEC can conclude that the local *T. carolina* population, if present, would likely have a poor probability of long-term persistence due to the limited possibility of genetic exchange.

Prior Site Layouts

Based on existing and future projected needs, while balancing sanitation and environmental concerns, the Town of Orleans initially evaluated various alternative layouts for the proposed wastewater treatment facility. Following review of many factors and through consultation with the Town, Wright Pierce selected a Preferred Layout (see attached Figure 1, April 2009) as part of the Town's draft Comprehensive Wastewater Management Plan (CWMP, draft dated October 2008). The Preferred Alternative and three (3) alternative layouts (Figures 2, 3, and 4) were included with the *Terrapene carolina Habitat Assessment Report* (4/23/09) and EENF. The following reviews each alternative and associated impacts on potential *T. carolina* habitat. As stated above, NHESP's comments on these alternatives ultimately lead to the final CWMP design (described below).

Preferred Layout (Figure 1)

The Preferred Layout included constructing a new wastewater treatment facility, including multiple buildings and storage tanks, immediately south of the existing Tri-Town Septage Treatment Facility parking lot, primarily within forested upland conditions. This would allow the new facility to be constructed if the Tri-Town Septage

Treatment Facility must remain operational during construction activities. The Tri-Town Septage Treatment Facility currently services the un-sewered property owners in the Towns of Orleans, Brewster, and Eastham. That service must continue through the proposed construction period.

The Preferred Layout also included constructing five new disposal/infiltration basins (#'s 1, 2 and 8-10) in Phase I, slated to be built during a 2-year construction period beginning in 2013. The majority of these new basins would have resulted in alteration to existing forested upland habitat within the eastern portion of the site. However, the western portion of Basin #9 would have replaced a portion of an existing paved roadway east of the existing main building. The Preferred Layout proposed to utilize the eight existing disposal/infiltration basins during the construction period of 2013 to 2015, after which they would be abandoned. Presumably in a later phase of the project (now scheduled for the period of 2022 to 2027), Basin #'s 3-7 would have been constructed in the location of the eight existing disposal/infiltration basins. The majority of the work activities associated with constructing Basin #'s 3-7 were proposed to occur within existing developed conditions. However, there would have needed to be minimal alterations to forested upland conditions within the eastern portion of the site (Basin #'s 3, 4, and 6). In comparison to the existing basins, all proposed basins would have contained vertical retaining walls to define each basin. However, access ramps were to be present for maintenance purposes within each basin's interior. Following construction of all basins, a 10-foot wide gravel drive would have encircled the outer perimeter of the basins footprint. Areas in between each basin were to be reseeded with a native herbaceous seed mix for stabilization purposes. Those areas would receive occasional vehicle traffic for the purposes of maintaining the basins.

Figure 1 depicted the proposed Limit of Work (orange) and disturbed areas (yellow) within forested upland habitat associated with the Preferred Layout. As proposed, the Preferred Layout resulted in approximately 6.5± acres of disturbance (temporary and permanent) to existing *T. carolina* undeveloped habitat; approximately 2.0± acres for proposed structures, storage tanks, and associated lawn/landscaped areas and 4.5± acres for Basin #'s 1-10. In summary, the Preferred Alternative resulted in 6.5± acres of alteration to the existing 17.6± acres (36.9%) of actual *T. carolina* undeveloped habitat present on-site or 49.6% of existing forested upland. However, following construction and regrading activities, approximately 1.6± acres surrounding proposed structures and basins would have been restored and revegetated with a native herbaceous seed mix. Thus, 4.9± acres represent the total loss of actual *T. carolina* habitat on-site (27.8%). Additionally, herbaceous field habitat was to be maintained between the basins and could have functioned as potential *T. carolina* Feeding/Breeding, Migration, and potentially Limited Nesting Habitat.

Alternative A (Figure 2)

Alternative A proposed to reconstruct the existing wastewater facilities, essentially within the same footprint of the Tri-Town Septage facilities. In order to site all new structures and storage tanks, a minimal amount of forested upland habitat would have been altered directly south of the existing parking lot. Additionally, a new paved driveway was proposed to be constructed off Overland Way to provide secondary access to the new structures. During the construction process, measures would have been implemented to provide temporary septage handling. Alternative A included constructing five new disposal/infiltration basins #'s 6-10 in Phase 1 (2013 to 2015). The majority of these new basins resulted in alteration to existing forested upland habitat within the eastern portion of the site. However, portions of Basin #'s 6, 7, and 9 were proposed to occur within developed conditions. Similar to the Preferred Layout, Alternative A proposed to utilize the eight existing

disposal/infiltration basins during the construction period of 2013 to 2015, after which they will be abandoned. Presumably in a later phase of the project (tentatively scheduled for the period of 2022 to 2027), Basin #'s 1-5 would have been constructed in the location of the eight existing disposal/infiltration basins. The majority of the work activities associated with constructing Basin #'s 3-5 were proposed to occur within developed conditions, although, portions of Basin #'s 1, 2, and 4 would have occurred within forested upland habitat. As stated above, the proposed basins would contain vertical retaining walls to define each basin along with a perimeter 10-foot wide gravel access drive. Areas in between each basin would be reseeded with a native herbaceous seed mix for stabilization purposes.

As proposed, Alternative A resulted in approximately 5.4± acres of disturbance (temporary and permanent) to existing *T. carolina* undeveloped habitat; approximately 0.7± acres for the proposed expansion south of the Tri-Town's existing parking lot and 4.7± acres for Basin #'s 1-10. In summary, Alternative A resulted in 5.4± acres of the existing 17.6± acres (30.7%) of actual *T. carolina* undeveloped habitat present on-site or 41.2% of existing forested upland. However, following construction and regrading activities, approximately 1.6± acres surrounding the proposed structures and basins were proposed to be restored and revegetated with a native herbaceous seed mix. Thus, 3.8± acres represented the total loss of actual *T. carolina* habitat on-site (21.6%). Additionally, herbaceous field habitat were to be maintained between the basins and could have functioned as potential *T. carolina* Feeding/Breeding, Migration, and potentially Limited Nesting Habitat.

Alternative B (Figure 3)

Alternative B proposed to construct the new wastewater treatment facility south of the project site on Town-owned land off Bay Ridge Lane. Currently, this site is utilized by the Town of Orleans Highway Department as a storage/maintenance yard, containing multiple buildings and garages (see Photograph). Under existing conditions, approximately 2.3± acres of the 2.9± acre Highway Department property are developed. Undeveloped, fringing areas immediately surrounding the storage yard are comprised of a mix of native and invasive species, including, but not limited to black cherry, black locust, eastern red cedar (*Juniperus virginiana*), pussy willow, autumn olive, Japanese knotweed (*Polygonum cuspidatum*), fox grape (*Vitis labrusca*), and Asiatic bittersweet (*Celastrus orbiculata*). In order to accommodate the proposed wastewater facilities, a small portion of forested upland south of the existing development footprint would have needed to be altered (0.1± acres), north of an off-site, unnamed brackish pond.

Under Alternative B, utility lines (effluent force main) would have needed to be installed under Bay Ridge Lane extending northerly along Overland Way to the proposed disposal/infiltration basins located within the northeastern portion of the project site. As represented on Figure 3, Basin #'s 1, 2, 4, 6, and 8 would have been constructed primarily within forested upland conditions (highlighted in yellow), although portions of Basin #'s 1 and 2 would have occurred within the footprint of the existing compost shed and surrounding paved surfaces. This would have required complete removal of the compost shed and revegetating the northern portion of the shed's footprint.

As proposed, the Alternative B resulted in approximately 4.5± acres of disturbance (temporary and permanent) to existing *T. carolina* undeveloped habitat (17.6± acres) on the 26± acre project site, comprised of the basins' footprint within forested upland conditions. Thus, Alternative B will have temporarily altered 25.6% of actual *T. carolina* undeveloped habitat present on-site or 34.3% of existing forested upland. However, following construction and regrading activities, approximately 0.5± acres surrounding the proposed basins were to be

restored and revegetated with a native herbaceous seed mix. Thus, 4.0± acres represented the total loss of actual *T. carolina* habitat on-site (22.7%), in addition to the 0.1± acres on the Orleans Highway Department property. Additionally, herbaceous field habitat were to be maintained between the basins and could have functioned as potential *T. carolina* Feeding/Breeding, Migration, and potentially Limited Nesting Habitat.

Alternative C (Figure 4)

Alternative C proposed to renovate and utilize as much of the existing Tri-Town Septage Facility as practicable. However, in order to handle the new disposal/infiltration basins, new maintenance buildings and storage tanks would have needed to be constructed within forested upland areas immediately south of the existing parking lot. Basin construction would be phased similar to Alternative A described above.

As proposed, the Alternative C resulted in approximately 5.9± acres of disturbance to existing *T. carolina* undeveloped habitat; approximately 1.3± acres for the proposed expansion of the maintenance buildings and storage tanks and 4.6± acres for Basin #'s 1-10. Approximately 5.9± acres of the existing 17.6± acres (33.5%) of actual *T. carolina* undeveloped habitat present on-site or 45.0% of existing forested upland would be altered under Alternative C. However, following construction and regrading activities, approximately 1.5± acres surrounding the proposed structures and basins were to be restored and revegetated with a native herbaceous seed mix. Thus, 4.4± acres represented the total loss of actual *T. carolina* habitat on-site (25.0%). Additionally, herbaceous field habitat would have been maintained between the basins and could have functioned as potential *T. carolina* Feeding/Breeding, Migration, and potentially Limited Nesting Habitat.

Alternative Summary Table (in acres)

	Preferred Alternative	**Alternative A**	**Alternative B**	**Alternative C**
Structures*	2.0	0.7	0.1	1.3
Basin Footprint**	4.5	4.7	4.5	4.6
Restored/Revegetated Areas (post-construction)	1.6	1.6	0.5	1.5
Temporary & Permanent Alteration	6.5	5.4	4.6	5.9
Permanent Alteration	**4.9**	**3.8**	**4.1**	**4.4**

*Includes structures and surrounding lawn or landscaped conditions.

**Includes proposed developed conditions (e g., 10-foot wide gravel drive) surrounding the basins.

Expanded Environmental Notification Form Rare Species Review

Following review of the EENF, NHESP issued a comment letter on June 24, 2009, stating that *the NHESP anticipates that depending upon the selected alternative, the currently proposed project may or may not result in a "take" of the Eastern Box Turtle. While the majority of the proposed sewers and pumping stations occur outside of Priority Habitat or are exempt from MESA review pursuant to 321 CMR 10.14, the proposed construction of the wastewater treatment and disposal facilities located at the Tri-Town site will occur fully within the mapped habitat of the Eastern Box Turtle and is subject to MESA review...It is the opinion of the*

NHESP that alternatives which result in the least amount of direct and indirect (e.g., fragmentation of habitat) impacts to state-listed species habitat are preferred for the proposed wastewater treatment and disposal facilities. Therefore, the NHESP prefers Alternative B over the other alternatives. New alternative designs that maximize reuse of existing disturbed areas and avoid fragmentation of remaining undisturbed habitat area also likely to be preferred by the NHESP. The EENF Certificate emphasizes the need for the SEIR to evaluate avoidance/mitigation strategies and identify necessary project construction and post-construction conditions and commitments to avoid any adverse impacts to Eastern Box Turtle habitat.

Final Comprehensive Wastewater Management Plan

Tri-Town Septage Treatment Facility

Based on NHESP's EENF comments, the Town has selected a revised alternative layout that avoids, minimizes, and mitigates impacts to *T. carolina* at the Tri-Town site. The Recommended Layout depicted on Figure 11-2 (Dec 2010) implements a combination of the prior alternatives to reduce the amount of direct and indirect impacts to Eastern Box Turtle habitat. The design proposes to largely reconstruct the existing wastewater facilities, essentially within the same footprint of the Tri-Town Septage facilities. A new paved driveway is proposed to be constructed off Overland Way to provide secondary access to the new structures. The driveway has been consolidated close to the proposed new buildings and storage tanks. In order to site the driveway extension, a minimal amount of forested upland habitat will be altered directly south of the existing parking lot and abutting lawn areas. During the construction process, measures will be implemented to provide temporary septage handling.

The Recommended Layout includes constructing five new disposal/infiltration basins #'s 6-10 in Phase 1 (2015 to 2017). These proposed basin footprints primarily occur within forested upland habitat between the existing basins and compost shed. However, the western edges of Basin #'s 7 and 9 minimally occur within developed conditions. The Recommended Layout proposes to utilize the eight existing disposal/infiltration basins during the construction period of 2015 to 2017, after which they will be abandoned. Presumably in a later phase of the project (tentatively scheduled for the period of 2024 to 2029), Basin #'s 1-5 will be constructed in the location of the eight existing disposal/infiltration basins. The majority of the work activities associated with constructing Basin #'s 1, 3, and 5 are proposed to occur within developed conditions. Perimeter portions of Basin #'s 1, 2, 4, and 5 are located within forested upland habitat. All proposed basins will contain vertical retaining walls to define each basin along with a perimeter 10-foot wide gravel access drive. Areas in between each basin would be reseeded with a native herbaceous seed mix for stabilization purposes.

As proposed, the Recommended Layout results in approximately 6.0± acres of disturbance (temporary and permanent) to existing *T. carolina* undeveloped habitat; approximately 0.4± acres for the proposed expansion south of the Tri-Town's existing parking lot and 5.6 ± acres for the proposed basins and abutting 10-foot wide gravel access drives. Following construction and regrading activities, approximately 1.1± acres surrounding the outer perimeter of the proposed basins will be restored and revegetated with a native herbaceous seed mix. Thus, 4.9± acres represents the permanent disturbance of actual *T. carolina* habitat on-site (27.8%).

The Recommended Layout serves to maximize reuse of the existing developed and disturbed areas, while avoiding the fragmentation of remaining undisturbed habitat as requested by NHESP. As proposed, the Recommended Layout will afford contiguous forested upland habitat preservation south of the wastewater

facilities and basins. Once all construction is complete and the temporary work activities are stabilized by vegetation (Early Successional Edge Habitat), potential migration corridors will be maintained along the far eastern portion of the site, extending parallel to Route 6. Existing developed areas located west of proposed Basin #'s 1 and 3 may also be revegetated following construction. In summary, the Recommended Layout serves to promote the continued protection of *T. carolina* Overwintering, Feeding/Breeding, Migration, and Limited Nesting Habitat.

Final CWMP Summary Table (in acres)

	Recommended Layout
Structures/Driveway*	0.4
Basin Footprint**	5.6
Restored/Revegetated Areas (post-construction)	1.1
Temporary & Permanent Alteration	6.0
Permanent Alteration	**4.9**

*Includes structures, driveway, and surrounding lawn or landscaped conditions

**Includes proposed developed conditions (e.g., 10-foot wide gravel drive) surrounding the basins.

Small Wastewater Treatment Systems (Cluster Systems)

Similar to the proposed sewers and pumping stations, the CWMP includes the construction of small wastewater treatment systems or clusters systems that occur outside of Priority Habitat or are exempt from MESA review pursuant to 321 CMR 10.14. The cluster systems are meant to provide collection, treatment, and disposal of wastewater to small neighborhoods within watersheds proximate to either impacted coastal embayment or a freshwater Pond. Five cluster systems are proposed in total, only two of which occur within Priority Habitat.

Figure I-2 (Dec 2010) depicts a cluster system proximate to Lonnie's Pond and Crystal Pond and Figure I-5 (Dec 2010) depicts a cluster system south of Bakers Pond. Priority Habitat extends off both Ponds, generally engulfing undeveloped land. Presumably these Pond systems and abutting habitat areas are mapped for the presence of state-listed rare invertebrates and/or plants specific to the Ponds' shoreline or benthic habitat. Portions of sewering activities may occur within Priority Habitat, but will likely fall within an exempt category. Any associated treatment facility or effluent disposal area will be located outside Priority Habitat surrounding these Ponds.

Mitigating Measures

The Town is proposing a series of mitigating measures to avoid and minimize adverse impacts to *T. carolina* during and post-construction at the Tri-Town site.

Temporary Turtle Barriers

Prior to the initiation of any work, between April 1st and October 31st, the entire Limit of Work will be fully encircled with a continuous and properly installed silt fencing or a similar temporary turtle barrier approved by NHESP. Installation of the silt fencing will be conducted so as to minimize vegetation disturbance. The bottom of the silt fencing will be carefully buried in a 4-6 inch deep trench, to be backfilled and compacted. Any hay or straw bales shall be placed on the work-side of the siltation barrier or eliminated from use.

Pre-Construction Turtle Sweeps

Prior to the beginning of any work, including any tree clearing, the NHESP-approved wildlife biologist will review with NHESP the extent of required pre-construction turtle sweeps for all phased construction activities and associated Limit of Work. The wildlife biologist will utilize NHESP-approved protocols (specifying timing and duration of surveying effort) to locate *T. carolina* individuals. The wildlife biologist must obtain a Scientific Collection Permit in advance of the searches. All searches must be conducted during appropriate weather conditions and should occur between May 1st and October 15th, unless otherwise approved by NHESP. Any state-listed vertebrate species encountered during these searches shall be released in appropriate habitat near, but outside of, the construction areas. Within 10 days of the completion of searches by the qualified wildlife biologist, a report will be submitted to the NHESP indicating the dates of each pre-work search, the number of hours searched per date, all state-listed rare species encountered, and the condition of all turtle barriers. All state-listed species encountered will also be reported to the NHESP through a Rare Animal Observation Form to be included in the aforementioned report.

Pre-construction turtle sweeps are not necessary if work activities occur solely within existing developed conditions and commence during the *T. carolina* inactive season (October 31st through April 1st). Should temporary turtle barriers not be installed by April 1st, turtle sweeps must be conducted as approved by NHESP.

Contractor Education

A NHESP-approved wildlife biologist will conduct a training session to educate contractors on the likely presence of *T. carolina* within the vicinity of the Project. Reference materials will be distributed to describe proper identification of *T. carolina* and appropriate protocols should a turtle be encountered within the active construction area.

Construction Monitoring

Throughout the construction period, the temporary turtle barriers will be maintained in good condition and repaired as necessary. Materials to repair the barriers (i.e., additional siltation fencing and stakes) will be stockpiled on-site and be accessible to all persons. A full length check of the turtle barrier will be conducted daily by a person familiar with siltation barrier maintenance between March 15th and November 15th of each year to ensure that barriers prevent state-listed turtles from entering the limits of work.

If any *T. carolina* individuals are found within the Limit of Work: 1) the turtle will be immediately moved to the side of the barrier opposite the Limit of Work side, AND 2) within 24 hours, a full-length perimeter evaluation of the turtle barrier will be conducted to locate and repair, as necessary, any breaches that may have allowed turtles to enter into the Limit of Work area.

Proposed Field Edge Habitat Areas

As stated above, approximately 1.1± acres surrounding the wastewater facilities are proposed to be restored and revegetated with a native herbaceous seed mix. The restored field edge habitat will be maintained to function as potential *T. carolina* Feeding/Breeding, Migration, and potentially Limited Nesting Habitat. These habitat areas will not be mowed between May 15th and September 15th of any year. Should mowing occur between April 15th and May 14th and/or September 16th and October 15th, mower blade heights will be set at a minimum of 7 inches off the ground. In accordance with NHESP's *MOWING ADVISORY GUIDELINES IN RARE TURTLE HABITAT: PASTURES, SUCCESSIONAL FIELDS, AND HAYFIELDS* (February 23, 2009), mowing will be conducted in low gear or at slow speeds commencing within the interior of the site and working outward to allow turtles maximum time to move out of the field areas.

Summary

On behalf of the Town of Orleans, LEC has provided NHESP with this supplemental information on the Town of Orleans' Comprehensive Wastewater Management Plan (CWMP). Based on NHESP comments during the EENF process, the Town has selected a Recommended Layout for the primary wastewater treatment facility at the Tri-Town Septage Treatment Facility. The Recommended Layout depicted on Figure 11-2 (Dec 2010) avoids habitat fragmentation, while consolidating proposed work activities within existing developed conditions, thereby promoting on-site habitat protection. The Town is proposing a series of mitigating measures, including temporary turtle barriers, phase-specific pre-construction turtle sweeps, contractor education, construction monitoring, and field edge habitat creation and appropriate management, to achieve a conditional no "take" under MESA. As currently proposed, the project serves to avoid, minimize, and mitigate impacts to state-listed rare species habitat.

The Town will be submitting the SEIR shortly and wishes to complete NHESP review in order to obtain a conditional no "take" determination. Should you have any questions or require additional information, please do not hesitate to contact me in our Plymouth office at 508-746-9491 or bmadden@lecenvironmental.com.

Sincerely,

LEC Environmental Consultants, Inc.

Brian T. Madden
Wildlife Scientist

Ann M. Marton (BTM)
Ann M. Marton
Director of Ecological Services

cc: Town of Orleans (c/o George Meservey)
Wright-Pierce (Michael D. Giggey)

Photograph 1: Northeasterly view of forested upland conditions (typical) located south of existing parking lot and southwest of eight disposal/infiltration basins.*

Photograph 2: Northeasterly view of forested upland conditions and earthen cart path located within the eastern/northeastern portion of project site.*

*Photographs taken on February 11, 2009

Photograph 3: Southeasterly view of the existing eight disposal/infiltration basins.*

Photograph 4: Southwesterly view of forested upland habitat located within western portion of project site and abutting chain-linked fence.*

*Photographs taken on February 11, 2009

Photograph 5: Westerly/northwesterly view of forested wetland conditions located within the western portion of project site.*

Photograph 6: Southeasterly view of Orleans Highway Department property off Bay Ridge Lane.*

*Photographs taken on February 11, 2009

MASS GIS

Office of Geographic and Environmental Information (MASS GIS), Commonwealth of Massachusetts Executive Office of Environmental Affairs
1:5,000 MassGIS 2005 Orthophoto Aerial Image

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Environmental Consultants, Inc.
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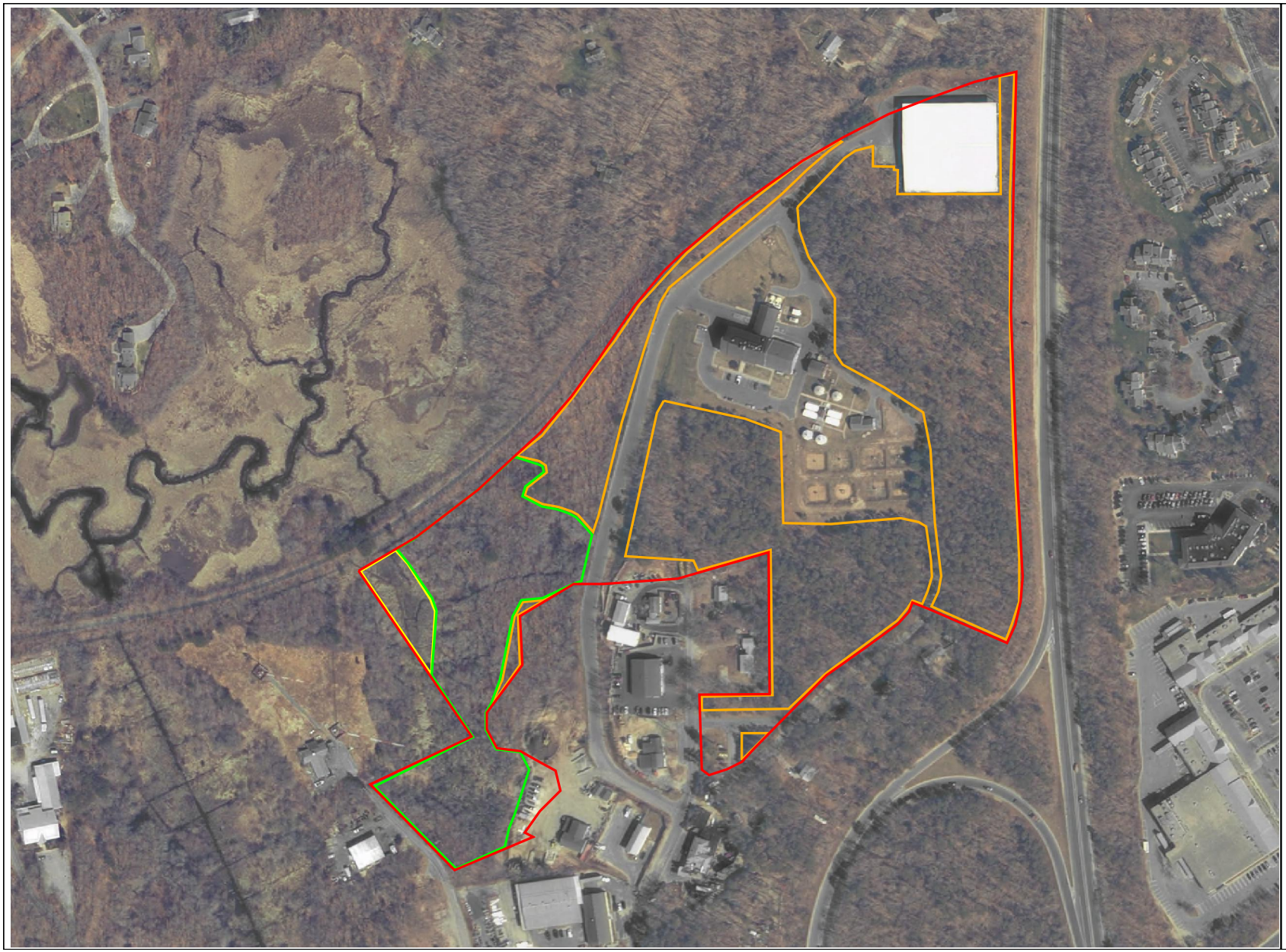
Plymouth, MA 02360
508.746.9491; 508.746.9492 Fax
southlec@lecenvironmental.com

Aerial Orthophoto

Proposed Wastewater Treatment Facility
29 Overland Way
Orleans, MA

Approx Scale
1:350

April 3, 2009



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southlec@lecenvironmental.com

Terrapene carolina Habitat Cover Type Map

Proposed Wastewater Treatment Facility
29 Overland Way
Orleans, MA

April 3, 2009

Legend

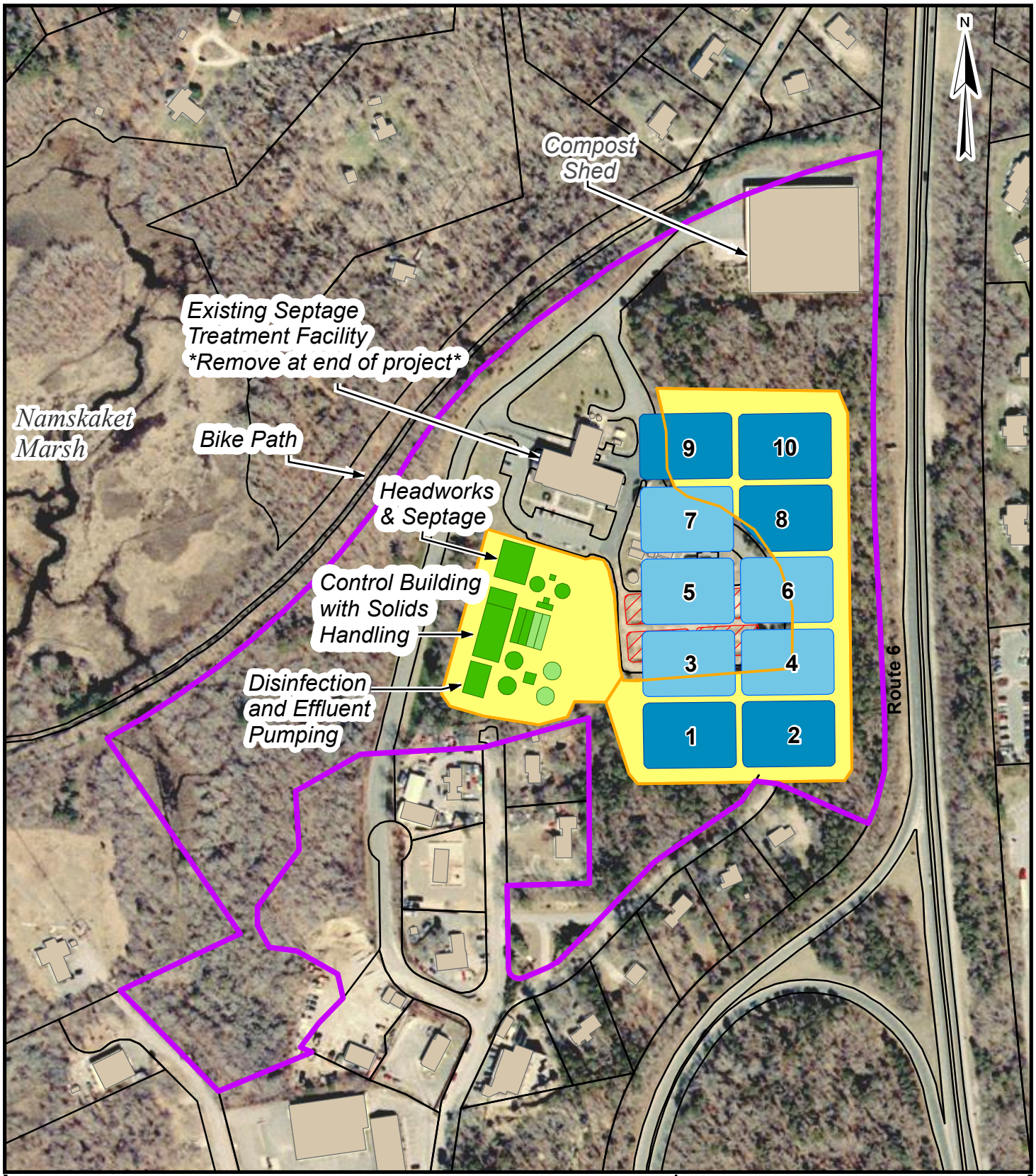
- Property Boundary (approx)
- Forested Upland (Overwintering, Feeding/ Breeding, & Migratory Habitat)
- Forested Wetland (Feeding/Breeding, Migratory, & limited Overwintering Habitat)
- Emergent Marsh (Limited Feeding/Breeding, & Migratory Habitat)

N

Approx. Scale 1:300

MASS GIS

Office of Geographic and Environmental Information (MASS GIS), Commonwealth of Massachusetts Executive Office of Environmental Affairs
1:5,000 MassGIS 2005 Orthophoto Aerial Image



Proposed Disposal Basins

- Phase 1
- Phase 4/5

Proposed Wastewater Treatment Plant

- Phase 1
- Phase 4

- Tri-Town Property Line
- Existing Buildings
- Existing Disposal Basins
- Limits of Work

0 125 250 375 500 Feet

Orleans CWMP

Layout of Proposed Wastewater Treatment and Disposal Facilities at Tri-Town Site

PROJ NO:	DATE:	FIGURE:
10645D	Apr 2009	1

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Engineering a Better Environment

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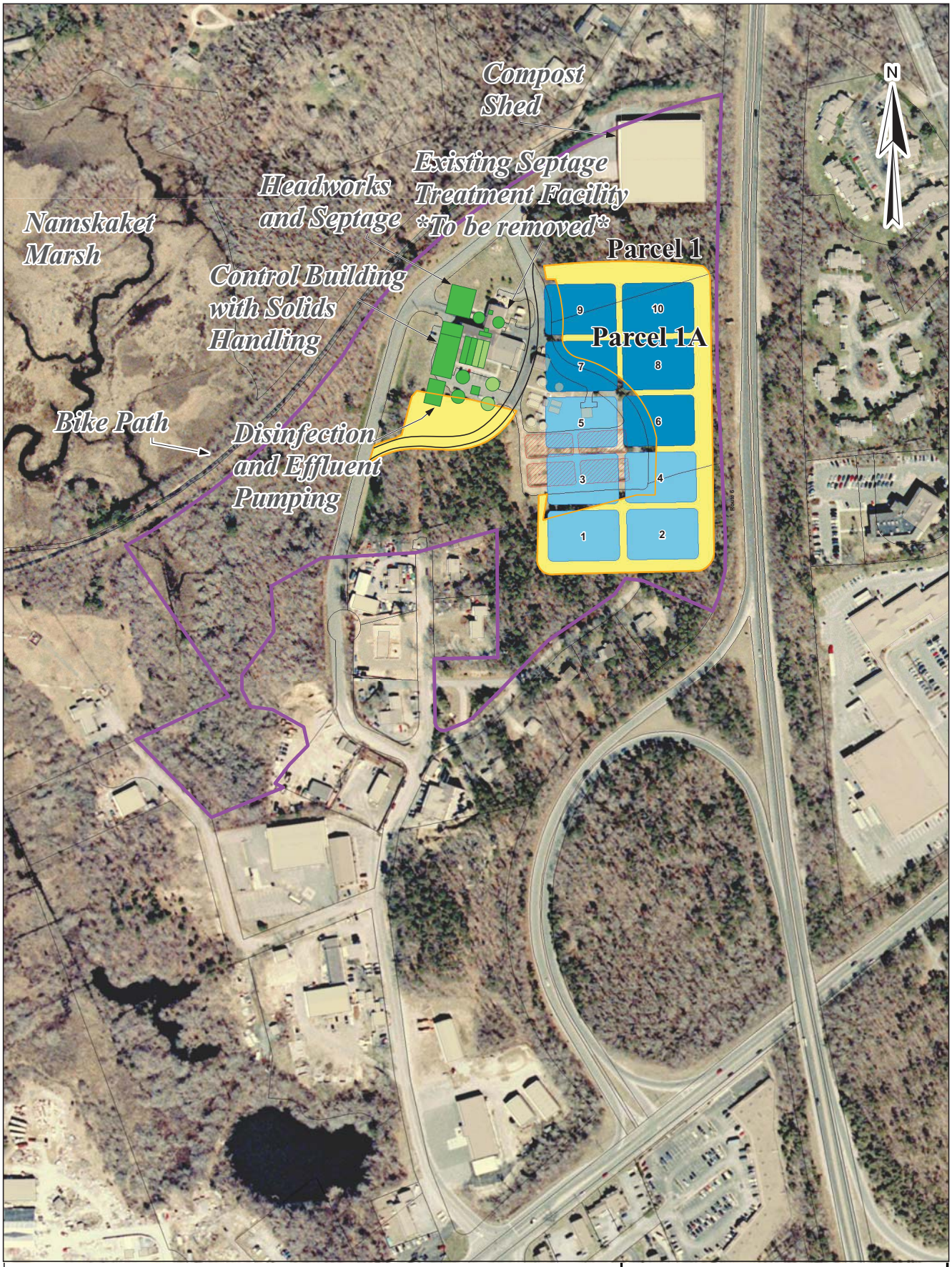

Proposed Disposal Basins
- Phase 1
- Phase 4/5

Proposed Wastewater Treatment Plant
- Phase 1
- Phase 4

- Tri-Town Property Line
- Existing Buildings
- Existing Disposal Beds
- Limits Of Work

0 100 200 300 400 Feet

Orleans CWMP

Proposed Wastewater Treatment and Disposal Facilities
Alternate Layout A
Demolish Existing Facilities

PROJ NO:	DATE:	FIGURE:
10645G	Apr 2009	2

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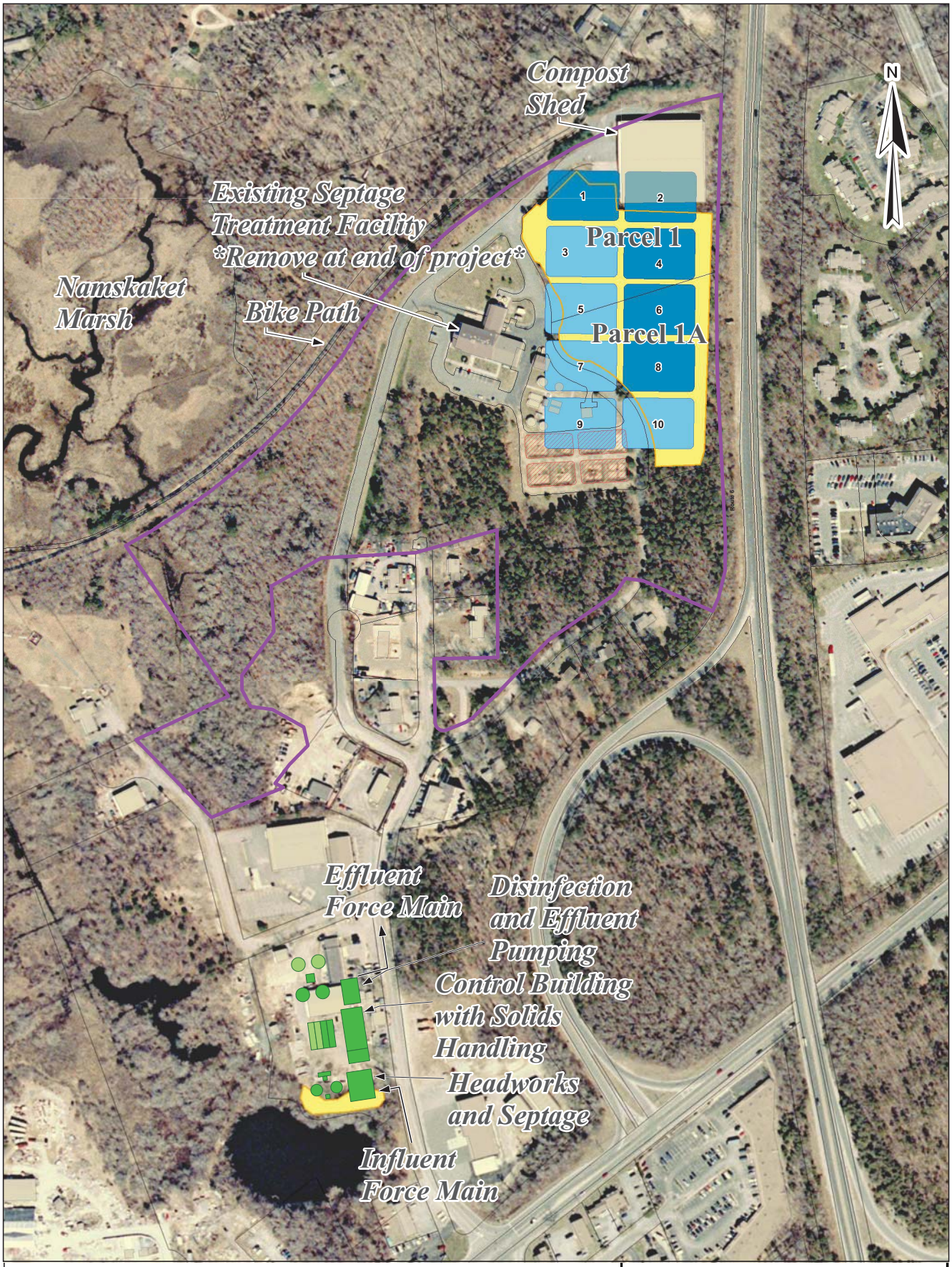

Proposed Disposal Basins
- Phase 1
- Phase 4/5

Proposed Wastewater Treatment Plant
- Phase 1
- Phase 4

- Tri-Town Property Line
- Existing Buildings
- Existing Disposal Beds
- Limits Of Work

0 100 200 300 400 Feet

Orleans CWMP
Proposed Wastewater Treatment and Disposal Facilities
Alternate Layout B
Maximize use of Parcel 1/1A for Effluent Disposal

PROJ NO:	DATE:	FIGURE:
10645G	Apr 2009	3

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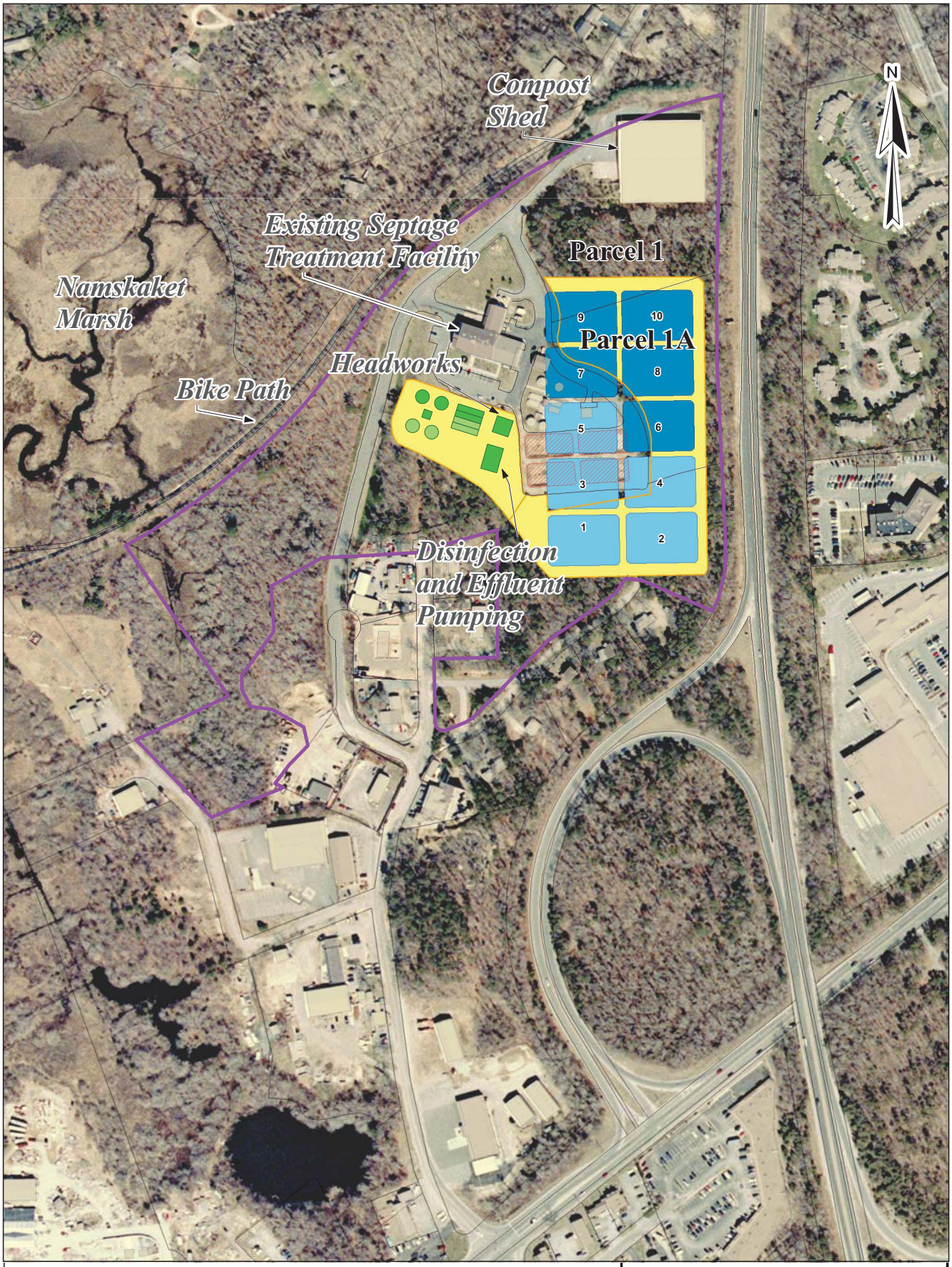

Proposed Disposal Basins
- Phase 1
- Phase 4/5

Proposed Wastewater Treatment Plant
- Phase 1
- Phase 4

- Tri-Town Property Line
- Existing Buildings
- Existing Disposal Basins
- LimitsOfWork

0 100 200 300 400 Feet

Orleans CWMP

Proposed Wastewater Treatment and Disposal Facilities
Alternate Layout C
Existing Facilities Reused

PROJ NO:	DATE:	FIGURE:
10645G	Apr 2009	4

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Existing Septage Treatment Facility *To be removed*

Compost Shed

Headworks and Septage

Namskaket Marsh

Control Building with Solids Handling

Bike Path

Disinfection and Effluent Pumping

Parcel 1

Parcel 1A

9 10 7 8 6 5 3 4 1 2

Route 6

N

Proposed Disposal Basins

- Phase 1
- Phase 4/5

Proposed Wastewater Treatment Plant

- Phase 1
- Phase 4

- Tri-Town Property Line
- Existing Buildings
- Existing Disposal Beds
- Disturbed Area

0 100 200 300 400 Feet

Orleans CWMP

Proposed Wastewater Treatment and Disposal Facilities

PROJ NO:	DATE:	FIGURE:
10645G	Dec 2010	11-2

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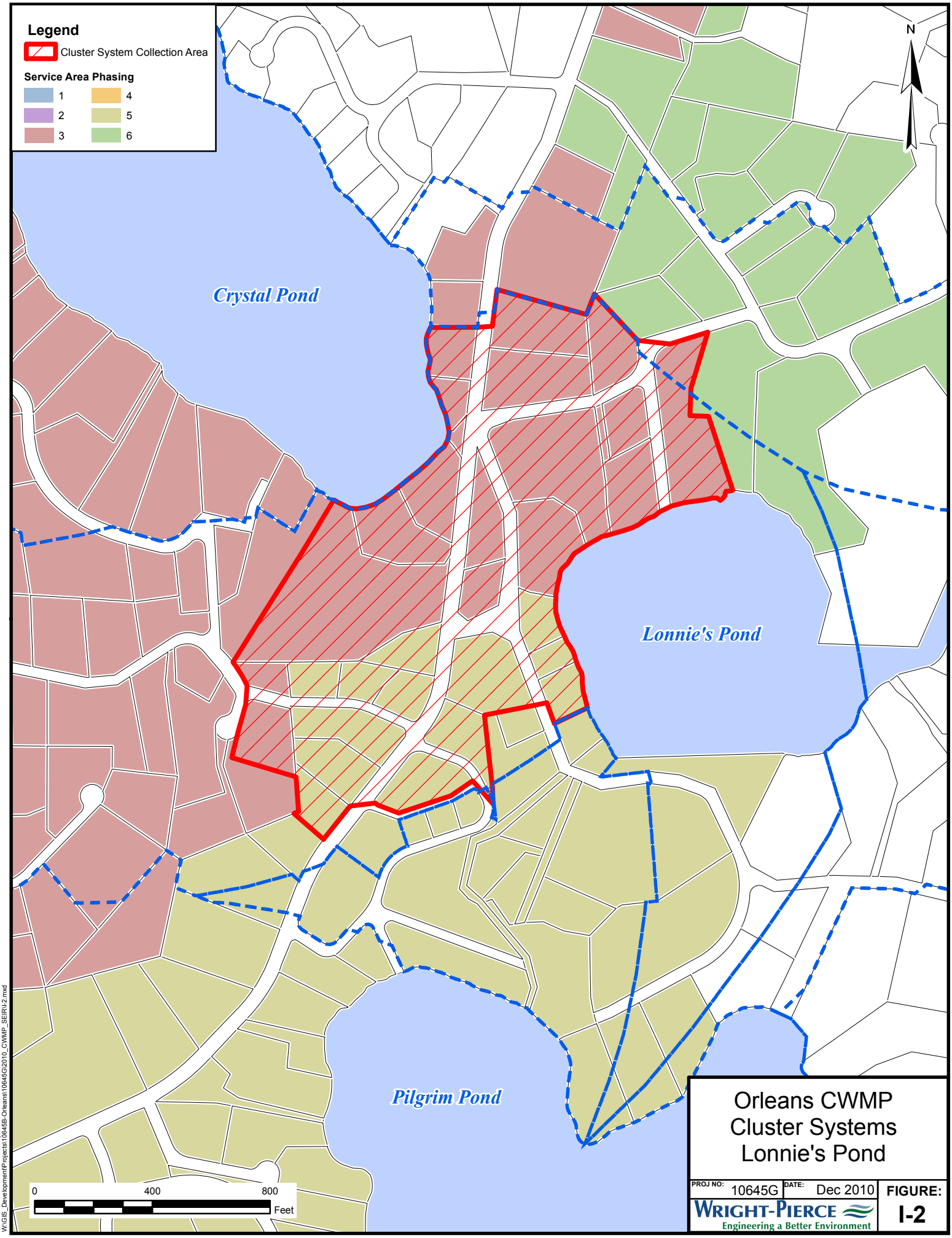
Legend
Cluster System Collection Area
Service Area Phasing
1
2
3
4
5
6
N
Crystal Pond
Lonnie's Pond
Pilgrim Pond
0
400
800
Feet
Orleans CWMP
Cluster Systems
Lonnie's Pond
PROJ NO: 10645G
DATE: Dec 2010
FIGURE: I-2
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Engineering a Better Environment
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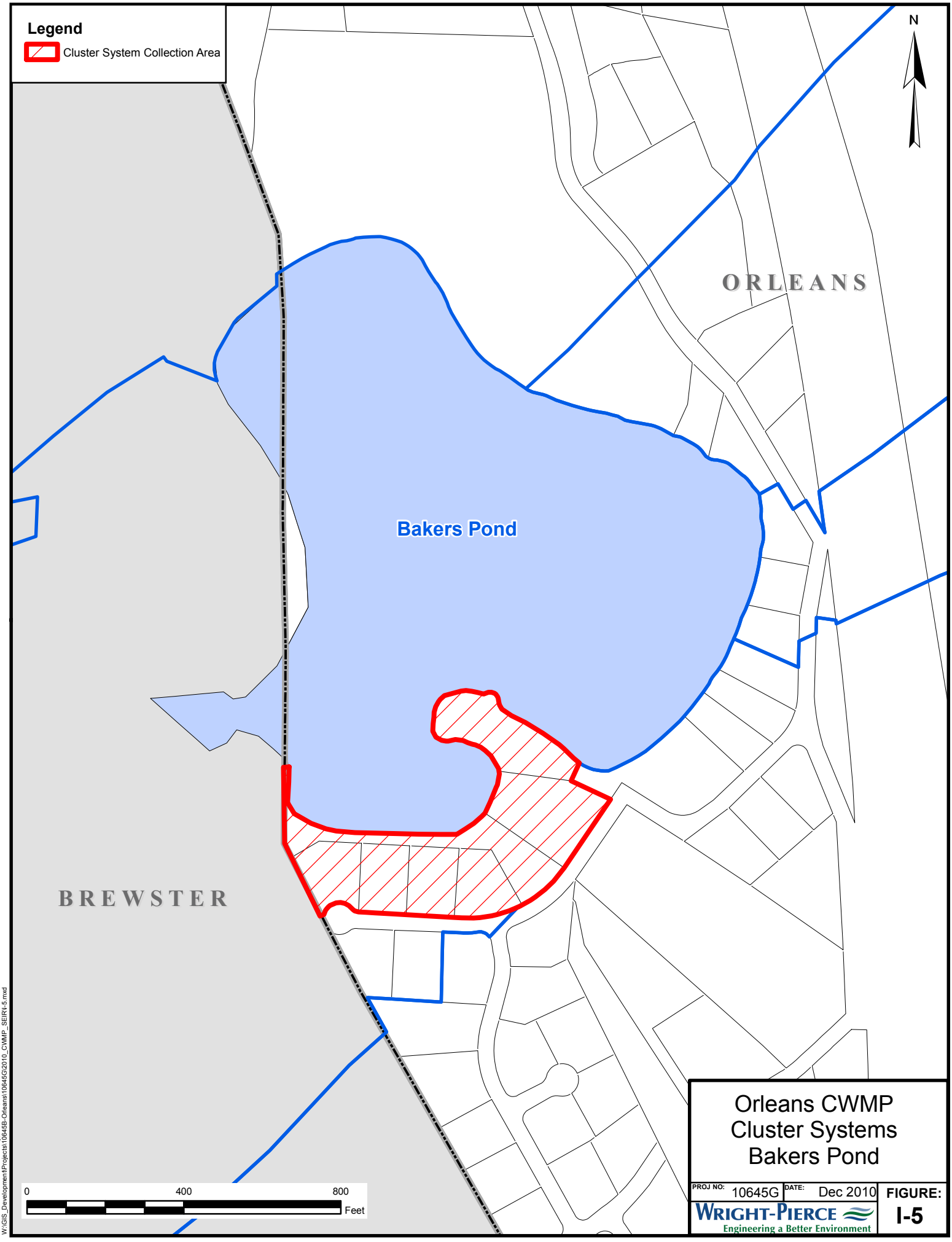
Legend
Cluster System Collection Area
N
ORLEANS
Bakers Pond
BREWSTER
0
400
800
Feet
Orleans CWMP
Cluster Systems
Bakers Pond
PROJ NO: 10645G
DATE: Dec 2010
FIGURE:
I-5
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Engineering a Better Environment
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