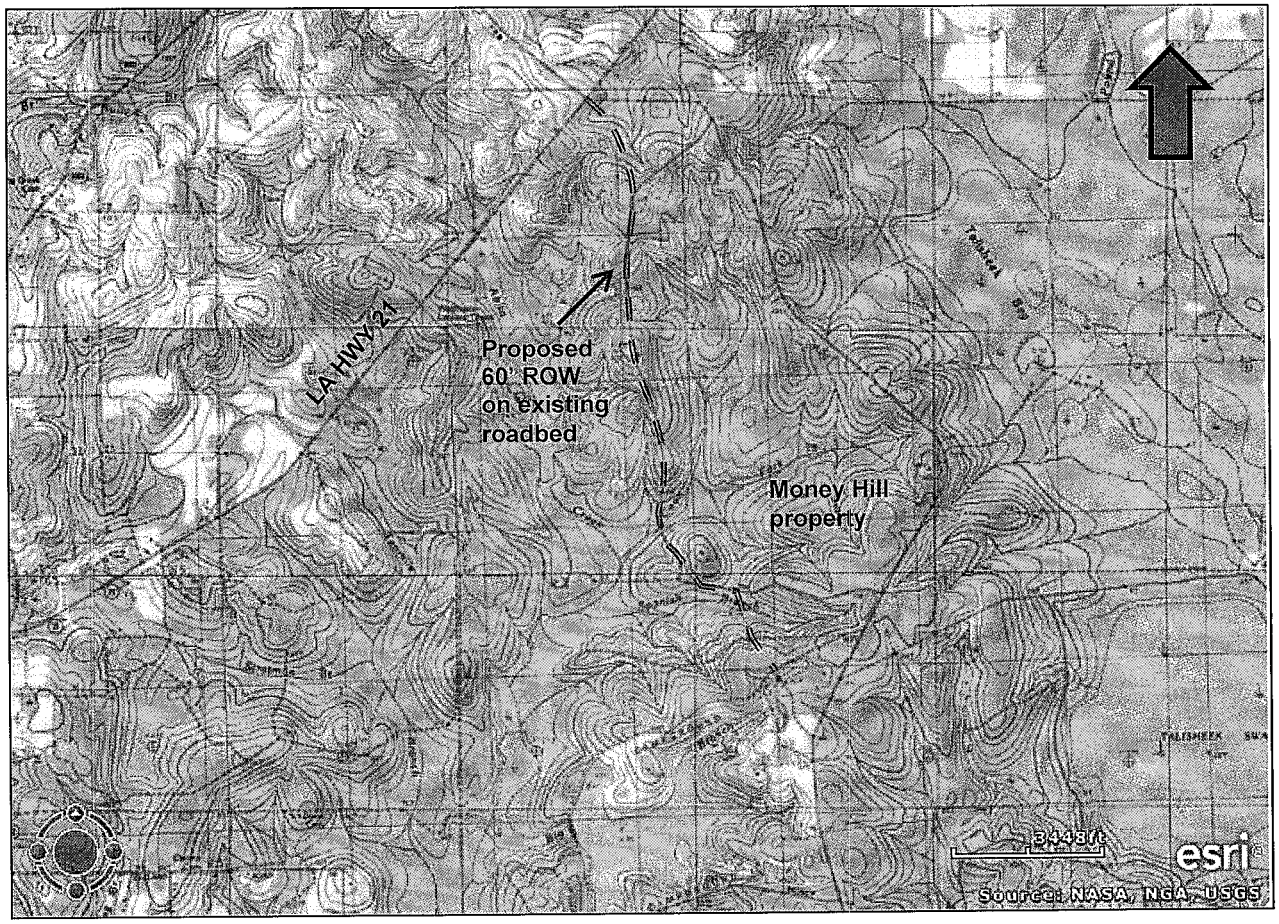
Vicinity Map

3448 ft

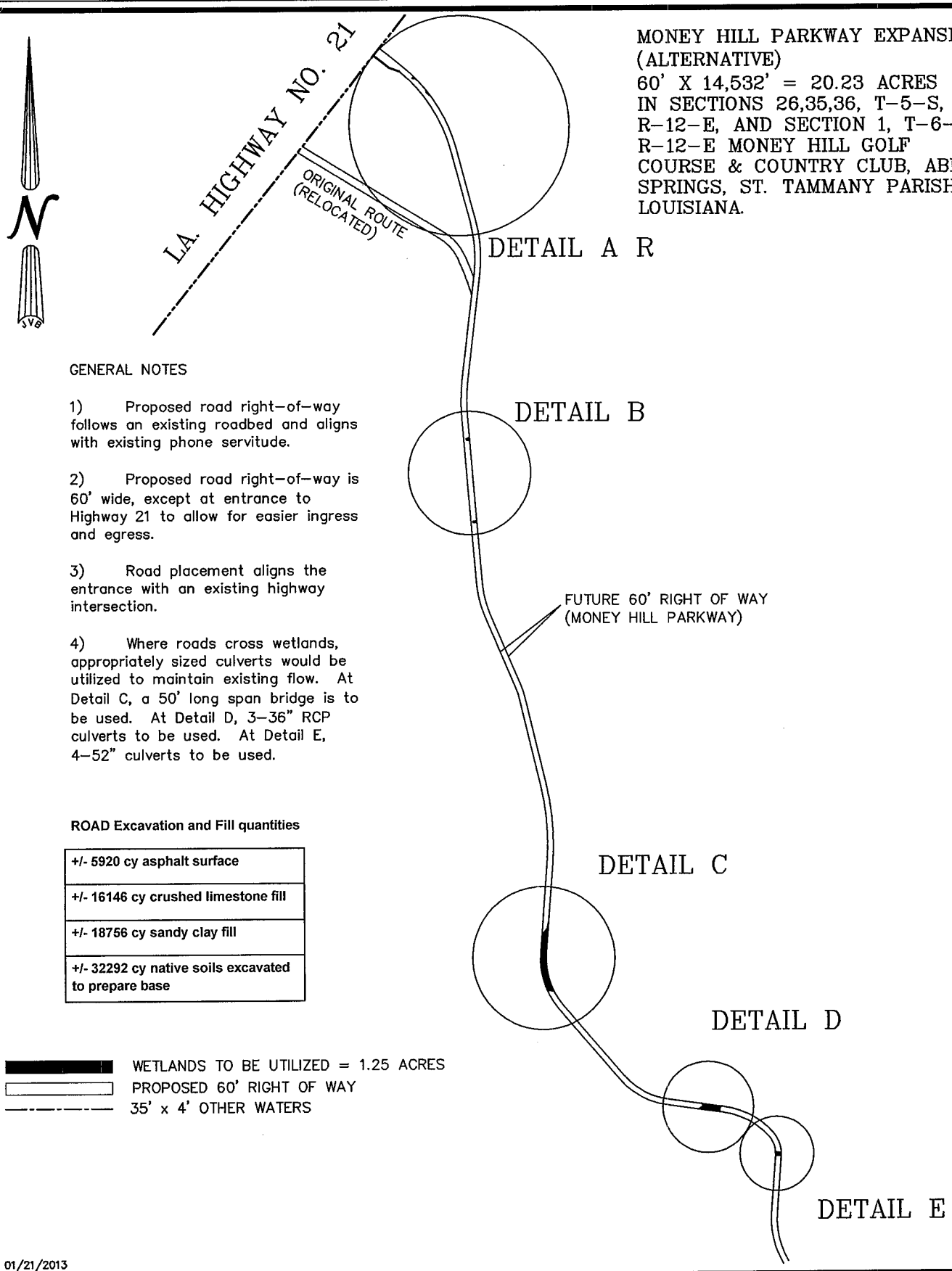
Money Hill Plantation, LLC
Money Hill Parkway Extension, Abita Springs, LA



Approximately 20.23 acres of existing dirt/grass roads located in

Sections 26, 35, 36 – T5S – R12E and Section 1 – T6S –R12E
near Abita Springs, St. Tammany Parish, LA.

30° 35' 31.641" N / 89° 57' 49.521" W



MONEY HILL PARKWAY EXPANSION (ALTERNATIVE)
60' X 14,532' = 20.23 ACRES IN SECTIONS 26,35,36, T-5-S, R-12-E, AND SECTION 1, T-6-S, R-12-E MONEY HILL GOLF COURSE & COUNTRY CLUB, ABITA SPRINGS, ST. TAMMANY PARISH, LOUISIANA.

GENERAL NOTES

1) Proposed road right-of-way follows an existing roadbed and aligns with existing phone servitude.

2) Proposed road right-of-way is 60' wide, except at entrance to Highway 21 to allow for easier ingress and egress.

3) Road placement aligns the entrance with an existing highway intersection.

4) Where roads cross wetlands, appropriately sized culverts would be utilized to maintain existing flow. At Detail C, a 50' long span bridge is to be used. At Detail D, 3-36" RCP culverts to be used. At Detail E, 4-52" culverts to be used.

ROAD Excavation and Fill quantities

+/- 5920 cy asphalt surface
+/- 16146 cy crushed limestone fill
+/- 18756 cy sandy clay fill
+/- 32292 cy native soils excavated to prepare base

WETLANDS TO BE UTILIZED = 1.25 ACRES
PROPOSED 60' RIGHT OF WAY
35' x 4' OTHER WATERS

REVISED 01/21/2013

DATE: 06/06/2012

SCALE: NTS

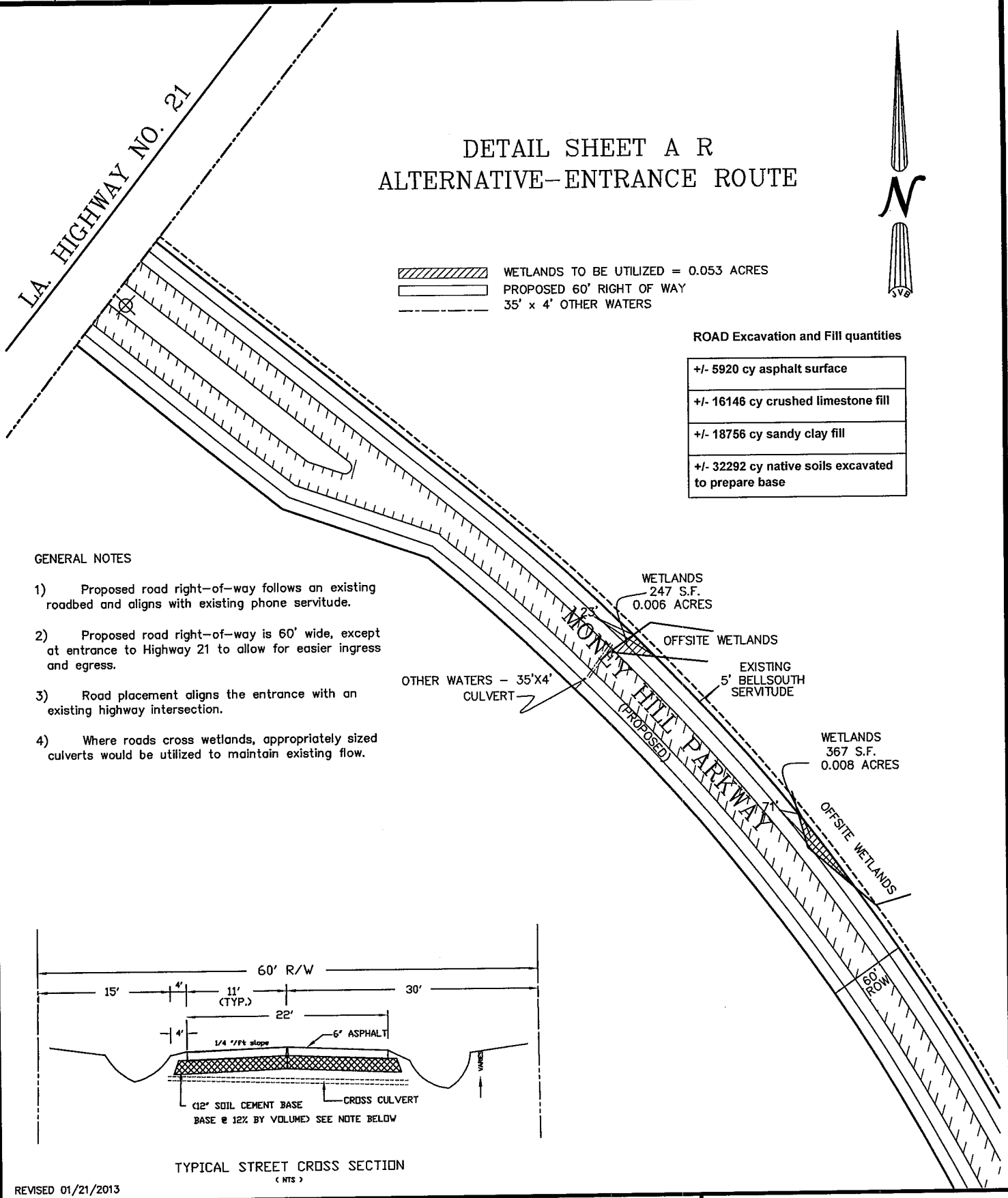
J.V. Burkes & Associates, Inc.
SURVEYING ENGINEERING • ENVIRONMENTAL
1805 Shortcut Highway
Slidell, Louisiana 70458
E-mail: jvbassoc@jvburkes.com
Phone: 985-649-0075 Fax: 985-649-0154
Mississippi Phone: 228-435-5800

SITE PLAN
MONEY HILL PARKWAY

Money Hill Plantation

PATHFILE: \\(M:\)SURVEYING\2012\BOUNDARY SURVEY\T05-R12\SEC. 25\20120206, 26-5-12, MONEY HILL PARKWAY\dwg\20120206.dwg

DETAIL SHEET A R
ALTERNATIVE–ENTRANCE ROUTE



ROAD Excavation and Fill quantities

+/- 5920 cy asphalt surface
+/- 16146 cy crushed limestone fill
+/- 18756 cy sandy clay fill
+/- 32292 cy native soils excavated to prepare base

GENERAL NOTES

1) Proposed road right–of–way follows an existing roadbed and aligns with existing phone servitude.

2) Proposed road right–of–way is 60' wide, except at entrance to Highway 21 to allow for easier ingress and egress.

3) Road placement aligns the entrance with an existing highway intersection.

4) Where roads cross wetlands, appropriately sized culverts would be utilized to maintain existing flow.

TYPICAL STREET CROSS SECTION
(NTS)

REVISED 01/21/2013

DATE: 06/06/2012

SCALE: 1"=100'

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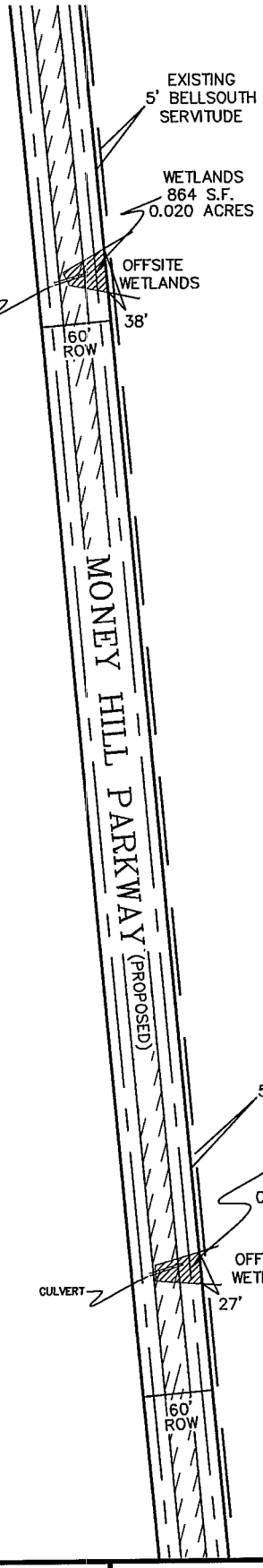
1805 Shortcut Highway
Slidell, Louisiana 70458
E–mail: jvbassoc@jvburkes.com
Phone: 985–649–0075 Fax: 985–649–0154
Mississippi Phone: 228–435–5800

DETAIL A R
MONEY HILL PARKWAY

Money Hill Plantation

PATHFILE: \\(M:\ISURVEYING\2012\BOUNDARY SURVEY\T06–R12\SEC. 26\20120206, 26–5–12, MONEY HILL PARKWAY\dwg\20120206.dwg

DETAIL SHEET B ALTERNATIVE



WETLANDS TO BE UTILIZED = 0.020 ACRES

PROPOSED 60' RIGHT OF WAY

ROAD Excavation and Fill quantities

+/- 5920 cy asphalt surface
+/- 16146 cy crushed limestone fill
+/- 18756 cy sandy clay fill
+/- 32292 cy native soils excavated to prepare base

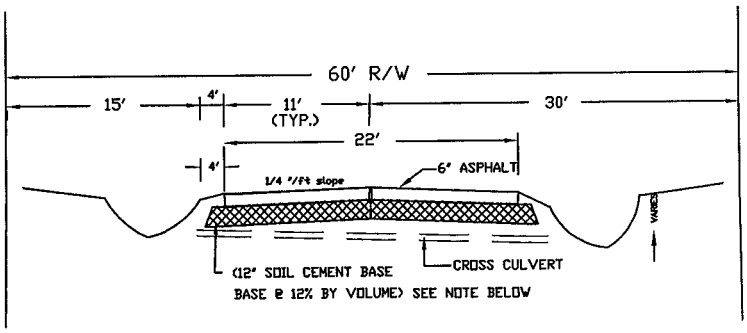
GENERAL NOTES

1) Proposed road right-of-way follows an existing roadbed and aligns with existing phone servitude.

2) Proposed road right-of-way is 60' wide, except at entrance to Highway 21 to allow for easier ingress and egress.

3) Road placement aligns the entrance with an existing highway intersection.

4) Where roads cross wetlands, appropriately sized culverts would be utilized to maintain existing flow.



TYPICAL STREET CROSS SECTION
(NTS)

REVISED 01/21/2013

DATE: 06/06/2012

SCALE: 1"=150'

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1805 Shortcut Highway
Slidell, Louisiana 70458
E-mail: jvbassoc@jvburkes.com
Phone: 985-649-0075 Fax: 985-649-0154
Mississippi Phone: 228-435-5800

DETAIL B
MONEY HILL PARKWAY

Money Hill Plantation

PATHFILE: \\(M:\SURVEYING\2012\BOUNDARY SURVEY\T06-R12\SEC. 26\20120206, 26-5-12, MONEY HILL PARKWAY\dwg\20120206.dwg

DETAIL SHEET C ALTERNATIVE

WETLANDS TO BE UTILIZED = 0.879 ACRES
PROPOSED 60' RIGHT OF WAY

ROAD Excavation and Fill quantities

+/- 5920 cy asphalt surface
+/- 16146 cy crushed limestone fill
+/- 18756 cy sandy clay fill
+/- 32292 cy native soils excavated to prepare base

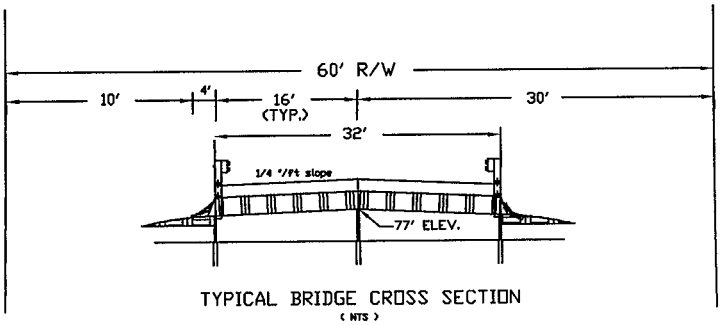
GENERAL NOTES

1) Proposed road right-of-way follows an existing roadbed and aligns with existing phone servitude.

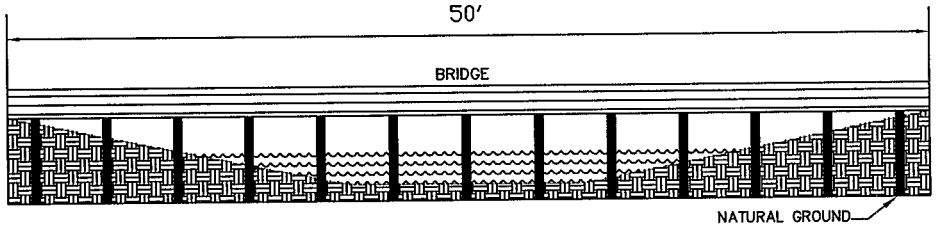
2) Proposed road right-of-way is 60' wide, except at entrance to Highway 21 to allow for easier ingress and egress.

3) Road placement aligns the entrance with an existing highway intersection.

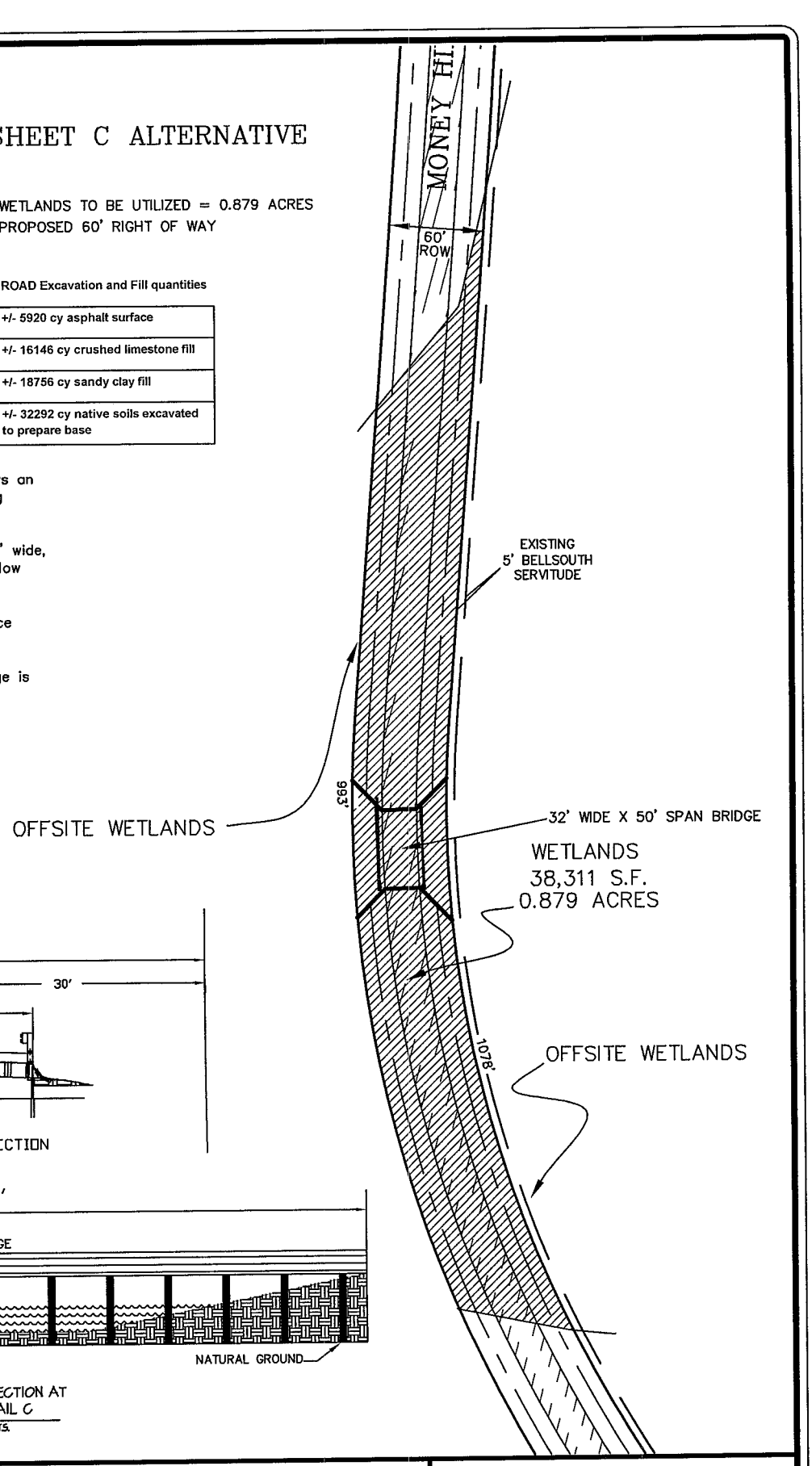
4) At Detail C, a 50' long span bridge is to be used.



TYPICAL BRIDGE CROSS SECTION
(NTS)



CROSS SECTION AT DETAIL C
N.T.S.



REVISED 01/21/2013

DATE: 06/06/2012

SCALE: 1"=100'

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1805 Shortcut Highway
Slidell, Louisiana 70458
E-mail: jvbassoc@jvburkes.com
Phone: 985-649-0075 Fax: 985-649-0154
Mississippi Phone: 228-435-5800

DETAIL C
MONEY HILL PARKWAY

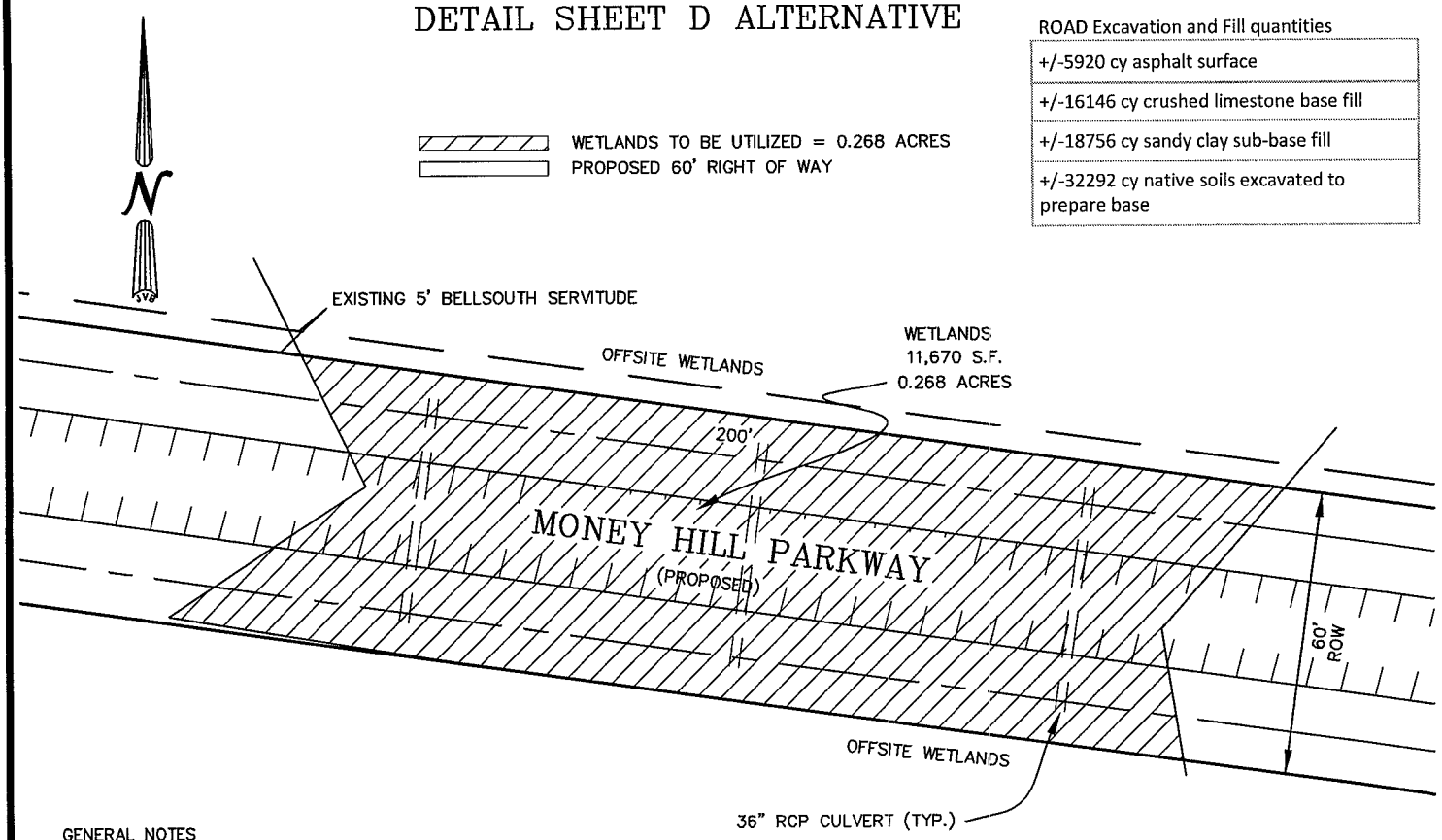
Money Hill Plantation

PATHFILE: \\(M:\|SURVEYING\2012\BOUNDARY SURVEY\T06-R12\SEC. 26\20120206, 26-5-12, MONEY HILL PARKWAY\dwg\20120206.dwg

DETAIL SHEET D ALTERNATIVE

ROAD Excavation and Fill quantities
+/-5920 cy asphalt surface
+/-16146 cy crushed limestone base fill
+/-18756 cy sandy clay sub-base fill
+/-32292 cy native soils excavated to prepare base

WETLANDS TO BE UTILIZED = 0.268 ACRES
PROPOSED 60' RIGHT OF WAY



GENERAL NOTES

1) Proposed road right-of-way follows an existing roadbed and aligns with existing phone servitude.

2) Proposed road right-of-way is 60' wide, except at entrance to Highway 21 to allow for easier ingress and egress.

3) Road placement aligns the entrance with an existing highway intersection.

4) 3-36" RCP culverts to be used.

Detail D – Alternative would utilize oversized culverts at the wetland crossing, at minimum 150% of the standard recommended volume, countersunk below the natural invert elevation of wetland and sloped to match the existing natural wetland gradient.

REVISED 01/21/2013

DATE: 06/06/2012

SCALE: 1"=40'

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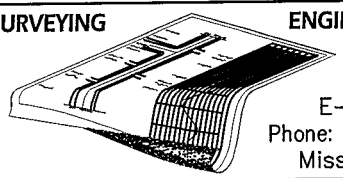


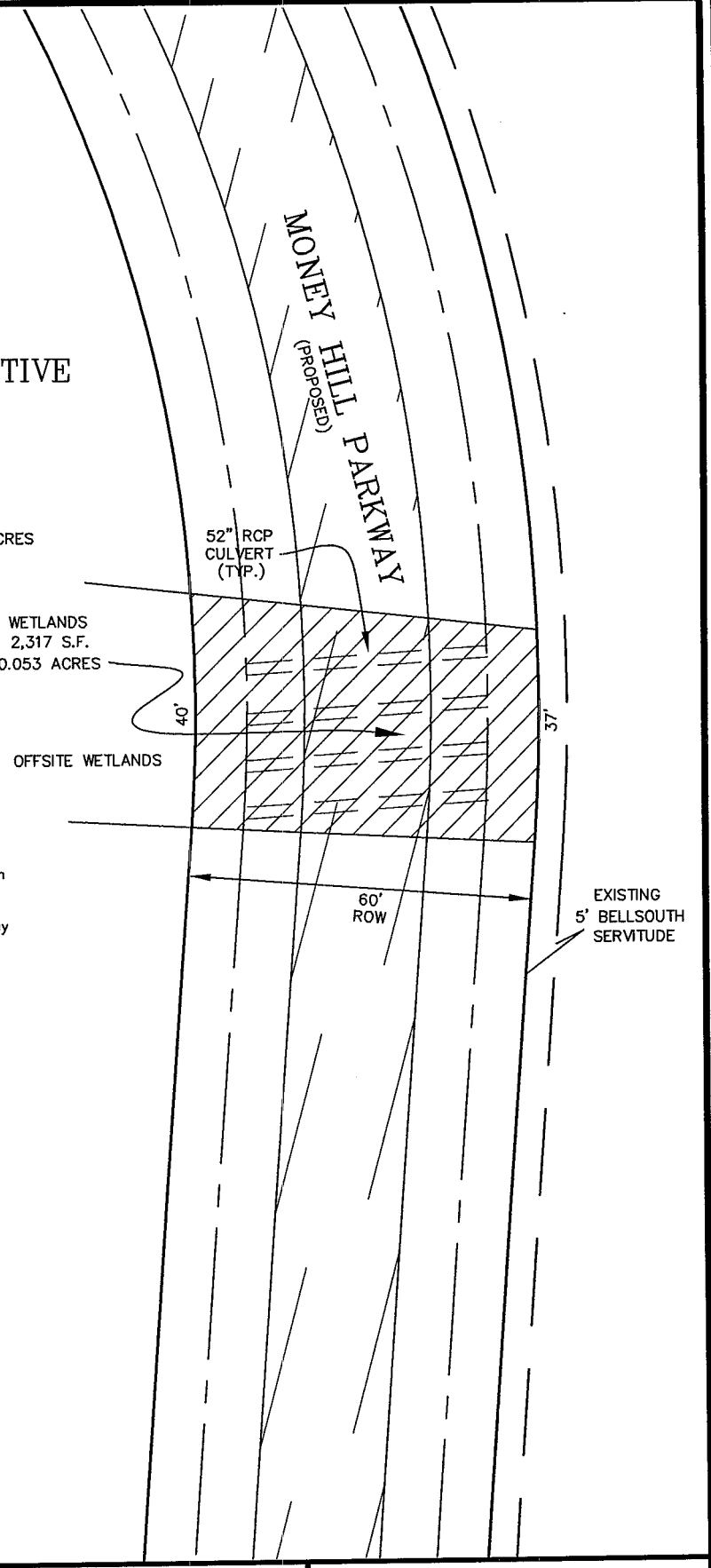
1805 Shortcut Highway
Slidell, Louisiana 70458
E-mail: jvbassoc@jvburkes.com
Phone: 985-649-0075 Fax: 985-649-0154
Mississippi Phone: 228-435-5800

DETAIL D
MONEY HILL PARKWAY

Money Hill Plantation

PATHFILE: \\(M:\)SURVEYING\2012\BOUNDARY SURVEY\T06-R12\SEC. 26\20120206, 26-5-12, MONEY HILL PARKWAY\dwg\20120206.dwg

DETAIL SHEET E ALTERNATIVE



WETLANDS TO BE UTILIZED = 0.053 ACRES

PROPOSED 60' RIGHT OF WAY

ROAD Excavation and Fill quantities

+/-5920 cy asphalt surface
+/-16146 cy crushed limestone base fill
+/-18756 cy sandy clay sub-base fill
+/-32292 cy native soils excavated to prepare base

GENERAL NOTES

1) Proposed road right-of-way follows an existing roadbed and aligns with existing phone servitude.

2) Proposed road right-of-way is 60' wide, except at entrance to Highway 21 to allow for easier ingress and egress.

3) Road placement aligns the entrance with an existing highway intersection.

4) 4-52" culverts to be used.

Detail E – Alternative would utilize oversized culverts at the wetland crossing, at minimum 150% of the standard recommended volume, countersunk below the natural invert elevation of wetland and sloped to match the existing natural wetland gradient.

REVISED 01/21/2013

DATE: 06/06/2012

SCALE: 1"=30'

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1805 Shortcut Highway
Slidell, Louisiana 70458
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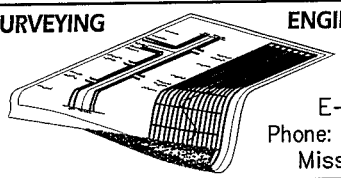
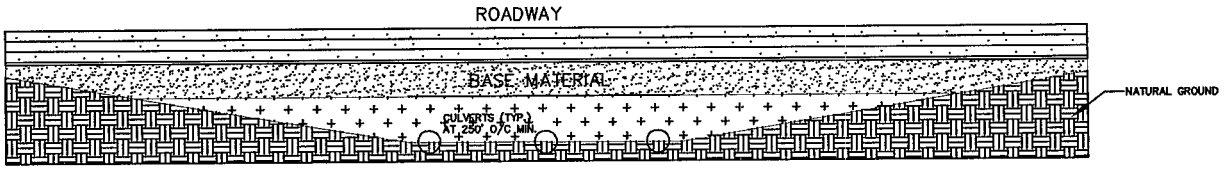


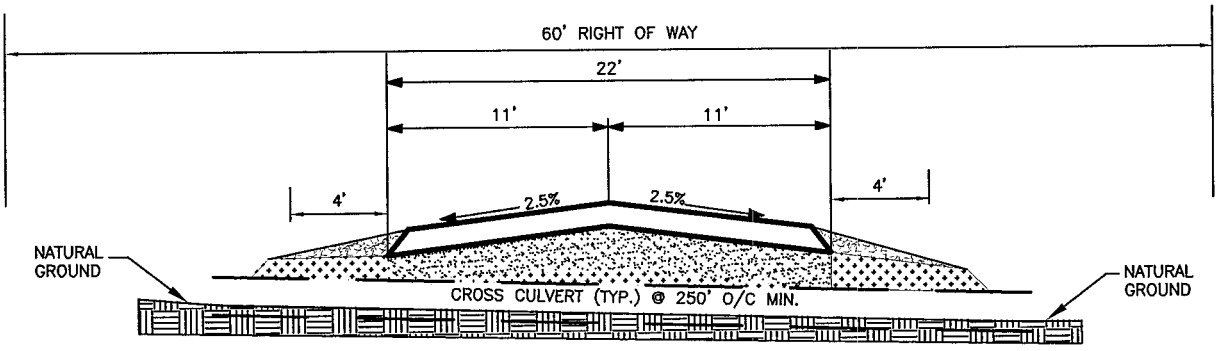
DETAIL E
MONEY HILL PARKWAY

Money Hill Plantation

PATHFILE: \\(M:\SURVEYING\2012\BOUNDARY SURVEY\T06-R12\SEC. 26\20120206, 26-5-12, MONEY HILL PARKWAY\dwg\20120206.dwg



CROSS SECTION AT
DETAILS D AND E
N.T.S.



TYPICAL CROSS SECTION DETAILS D AND E

N.T.S.

GENERAL NOTES

1) Proposed road right-of-way follows an existing roadbed and aligns with existing phone servitude.

2) Proposed road right-of-way is 60' wide, except at entrance to Highway 21 to allow for easier ingress and egress.

3) Road placement aligns the entrance with an existing highway intersection.

4) Where roads cross wetlands, appropriately sized culverts would be utilized to maintain existing flow. At Detail D, 3-36" RCP culverts to be used. At Detail E, 4-52" culverts to be used.

Details D and E – Alternative would utilize oversized culverts at the wetland crossing, at minimum 150% of the standard recommended volume, countersunk below the natural invert elevation of wetland and sloped to match the existing natural wetland gradient.

REVISED 01/21/2013

DATE: 06/06/2012

SCALE: N.T.S.

J.V. Burkes & Associates, Inc.
SURVEYING ENGINEERING • ENVIRONMENTAL
1805 Shortcut Highway
Slidell, Louisiana 70458
E-mail: jvbassoc@jvburkes.com
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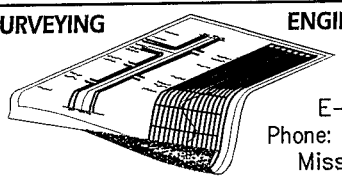

TYPICAL PROFILES FOR DETAILS D & E MONEY HILL PARKWAY Money Hill Plantation

PATHFILE: \\(M:\!SURVEYING\2012\BOUNDARY SURVEY\T06-R12\SEC. 26\20120206, 26-5-12, MONEY HILL PARKWAY\dwg\20120206.dwg

THREATENED AND ENDANGERED SPECIES SURVEY

Report Prepared for Money Hill Plantation
by Nelwyn McInnis
The Nature Conservancy
August 2012

Introduction

A survey was conducted on a tract of land comprising 20.23 acres in St. Tammany Parish, Louisiana (herein called the "Money Hill" tract) for three species listed pursuant to the Endangered Species Act of 1973, as amended. Two species known from the Money Hill area were the primary focus – Louisiana Quillwort (*Isoetes louisianensis*), listed as Endangered, and Gopher Tortoise (*Gopherus polyphemus*), listed as Threatened in the portion of its range that lies in Louisiana. A third species, Red-cockaded Woodpecker (*Picoides borealis*; RCW), listed as Endangered, is known from southeastern St. Tammany Parish and is presumed to have historically occupied the entire longleaf pine region, including Money Hill. The survey was conducted on June 22, 2012.

Description of the Target Species:

LOUISIANA QUILLWORT

Isoetes louisianensis
(Source: U.S. Fish and Wildlife Service Website:
http://www.ecos.fws.gov/speciesProfile)

STATUS: Endangered wherever found. Known from Louisiana and Mississippi. (*Federal Register,* October 28,1992).
DESCRIPTION: Quillworts are in a group of primitive ferns referred to as Fern Allies. Quillworts are aquatic or wetland plants that are similar in appearance to a tuft of grass or sedge. Unlike a flat blade of grass, the long, slender leaves are flat on one side and rounded in an arc on the other like the shape of a tortoise shell. There are 4 tubular air chambers running lengthwise that look circular upon cross-section, which is a diagnostic field characteristic for quillworts. For further information, see the attached excerpts of "5 Year Review: Summary and Evaluation, US Fish and Wildlife Service, 2012."

REPRODUCTION AND DEVELOPMENT: Reproduction is via megaspores and microspores produced in sporangia at the base of each leaf. Determination between quillwort species in Louisiana is based on differences in the shape of the megaspores and genetic differences. See attached 5 Year Review for additional information.
RANGE AND POPULATION LEVEL: See attached 5 Year Review excerpts.
HABITAT: See attached 5 Year Review excerpts.

GOPHER TORTOISE
Gopherus polyphemus
(Source: U.S. Fish and Wildlife Service Website:
http://www.fws.gov/endangered/i/c/sac2v.html)

STATUS: Threatened in Louisiana, Mississippi, and west of the Tombigbee and Mobile Rivers in Alabama (*Federal Register*, July 7, 1987).
DESCRIPTION: The gopher tortoise is a large, (shell 15 to 37 centimeters or 5.9 to 14.6 inches long) dark-brown to grayish-black terrestrial turtle with elephantine hind feet, shovel-like forefeet, and a gular projection beneath the head on the yellowish, hingeless plastron or undershell (Ernst and Barbour 1972). The sex of individual turtles can usually be determined by shell dimensions. A male turtle has a greater degree of lower shell concavity, and a longer gular projection. However, the sex of tortoises at maturity size is difficult to determine (U.S. Fish and Wildlife Service 199O).
This turtle feeds primarily on grasses, grass-like plants, and legumes. Its diet may also include mushrooms, fleshy fruits, and possibly some animal matter.
REPRODUCTION AND DEVELOPMENT: Sometime between late April and mid-July, the female digs out a 6-inch deep nest in sandy soil, lays a clutch of 4 to 12 eggs, and after refilling the hole leaves the eggs for incubation by the sun's heat. Hatching occurs in August and September. The juvenile tortoises suffer a heavy natural predation loss of almost 97 percent through the first 2 years of life. Those that survive grow to sexual maturity slowly over a period of 13 to 21 years, depending on the portion of the range and the sex of the turtles. Males usually reach sexual maturity at a younger age and a smaller size than females. Females usually reach reproductive maturity at 19 to 21 years old. The low reproductive rate is accentuated by the fact that there is some evidence to indicate that not all females nest every year (Lohoefener and Lohmeier 1984; Wright 1982.) The juveniles that are born and survive may live an average of 4O to 6O years, sometimes 8O to 1OO.
Most of the gopher tortoise's life is spent in and around the burrow. The gopher tortoise establishes a well-defined home range which increases in size as the tortoise grows older and larger. Gourley (1969) recorded a home range of 31,4OO square meters (7.7 acres) for a 20.3-centimeter (8-inch) specimen. For refuge the tortoises dig burrows which average around 5 to 1O feet in depth and may be 1O to 2O feet (or more) in length. The burrow becomes a more or less permanent home although there may be alternate burrows in the area. Several other species may also share gopher tortoise burrows. Some

commonly known burrow sssociates include the eastern indigo snake, the eastern diamondback rattlesnake, and the gopher frog (U.S. Fish and Wildlife Service 199O).
RANGE AND POPULATION LEVEL: The species occurs in sandy coastal plain areas from extreme southern South Carolina to the southeastern corner of Louisiana, and throughout most of Florida. The population segment from the Tombigbee and Mobile Rivers in Alabama, westward, is classified as threatened, and for convenience is termed the western population. This entire western population is within the original range of the longleaf pine. Using statistics of the U.S. Department of Agriculture (USDA) (1978a) the Fish and Wildlife Service estimates that present ownership distribution of gopher tortoise habitat is approximately two-tenths in National Forest, one-tenth in other public ownership, three-tenths in forest industry, and four tenths in other private ownership. No estimate is available for the gopher tortoise's total population size. Auffenberg and Franz (1982) estimated a population density of O.713 tortoises per hectare in Mississippi and O.97 tortoises per hectare in Alabama in 1975, whereas Lohoefener and Lohmeier (1984) estimated a density of O.1O7 and O.32 per hectare in those states, respectively, in the early 198O's. Lohoefener and Lohmeier (1984) were also able to document only 11 active burrows in Louisiana in 1981, and only one remaining in 1984. Although these estimates may not be strictly comparable because of different methodologies, there is an indicated decline in population densities ranging from 67 percent in Alabama to 91 percent in Louisiana.
HABITAT: The gopher tortoise most often lives on well-drained, sandy soils in transitional (forest and grassy) areas (Ernst and Barbour 1972). It is commonly associated with a pine overstory and an open understory with a grass and forb groundcover and sunny areas for nesting (Landers 1980).

RED-COCKADED WOODPECKER
Picoides borealis
(Source: U.S. Fish and Wildlife Service website:
http://www.fws.gov/rcwrecovery/rcw.htm

STATUS: Endangered
DESCRIPTION: About the size of the common cardinal, the Red-cockaded Woodpecker is approximately 7 inches long (18 to 20 centimeters), with a wingspan of about 15 inches (35 to 38 centimeters). Its back is barred with black and white horizontal stripes. The Red-cockaded Woodpecker's most distinguishing feature is a black cap and nape that encircle large white cheek patches. Rarely visible, except perhaps during the breeding season and periods of territorial defense, the male has a small red streak on each side of its black cap called a cockade, hence its name.
The Red-cockaded Woodpecker feeds primarily on beetles, ants, roaches, caterpillars, wood-boring insects, and spiders, and occasionally fruits and berries.
REPRODUCTION AND DEVELOPMENT: Red-cockaded Woodpeckers are a territorial, non-migratory, cooperative breeding species, frequently having the same mate for several years. The nesting season lasts from April through June. The breeding female

lays three to four eggs in the breeding male's roost cavity. Group members incubate the small white eggs for 10 to 12 days. Once hatched, the nestlings remain in the nest cavity for about 26 days.

Upon fledging, the young often remain with the parents, forming groups of up to nine members, but more typically three to four members. There is only one pair of breeding birds within each group, and they normally raise only a single brood each year. The other group members called helpers, usually males from the previous breeding season, help incubate the eggs and raise the young. Juvenile females generally leave the group before the next breeding season, in search of solitary male groups.

RANGE AND POPULATION LEVEL: Historically, this woodpecker's range extended from Florida to New Jersey and Maryland, as far west as Texas and Oklahoma, and inland to Missouri, Kentucky, and Tennessee. Today it is estimated that there are about 6,000 groups of red-cockaded woodpeckers, or 15000 birds from Florida to Virginia and west to southeast Oklahoma and eastern Texas, representing about 1 percent of the woodpecker's original range. They have been extirpated in New Jersey, Maryland, Tennessee, Missouri and Kentucky.

HABITAT: The Red-cockaded Woodpecker makes its home in mature pine forests. Longleaf pines (*Pinus palustris*) are most commonly preferred, but other species of southern pine are also acceptable. While other woodpeckers bore out cavities in dead trees where the wood is rotten and soft, the Red-cockaded Woodpecker is the only one which excavates cavities exclusively in living pine trees. The older pines favored by the Red-cockaded Woodpecker often suffer from a fungus called red heart disease which attacks the center of the trunk, causing the inner wood, the heartwood, to become soft. Cavities generally take from 1 to 3 years to excavate.

The aggregate of cavity trees is called a cluster and may include 1 to 20 or more cavity trees on 3 to 60 acres. The average cluster is about 10 acres. Cavity trees that are being actively used have numerous, small resin wells which exude sap. The birds keep the sap flowing apparently as a cavity defense mechanism against rat snakes and possibly other predators. The typical territory for a group ranges from about 125 to 200 acres, but observers have reported territories running from a low of around 60 acres, to an upper extreme of more than 600 acres. The size of a particular territory is related to both habitat suitability and population density.

The Red-cockaded Woodpecker plays a vital role in the intricate web of life of the southern pine forests. A number of other birds and small mammals use the cavities excavated by Red-cockaded Woodpeckers, such as chickadees, bluebirds, titmice, and several other woodpecker species, including the downy, hairy, and red-bellied woodpecker. Larger woodpeckers may take over a Red-cockaded Woodpecker cavity, sometimes enlarging the hole enough to allow screech owls, wood ducks, and even raccoons to later move in. Flying squirrels, several species of reptiles and amphibians, and insects, primarily bees and wasps, also will use Red-cockaded Woodpecker cavities.

REFERENCES:
Auffenberg, W., and R. Franz. 1982. The Status and Distribution of the Gopher Tortoise *Gopherus polyphemus*. Pages 95-126 *in* R. B. Bury (ed.). North American Tortoises: Conservation and Ecology. U.S. Fish and Wildlife Service Res. Rep. 12. 126 pp.
Diemer, J.E. 1984. Gopher tortoise Status and Harvest Impact Determination: A Progress Report. Florida Game and Fresh Water Fish Commission. 51 pp.
Ernst, C.H., and R.W. Barbour. 1972. Turtles of the United States. The University Press of Kentucky, Lexington, Kentucky. 347 pp.
Gourley, E.V. 1969. Orientation of the Gopher Tortoise, *Gopherus polyphemus* (Daudin). Diss. Abstr. Int. B. 31:446.
Landers, J.L. 1980. Recent Research on the Gopher Tortoise and Its Implications. Pages 8-14 *in* R. Franz and R. J. Bryant (eds.). Proc. 1st. Ann. Mtg., Gopher Tortoise Council. 80 pp.
Lohoefener, R., and L. Lohmeier. 1984. The Status of *Gopherus polyphemus* (Testudines, Testudinidae) West of the Tombigbee and Mobile Rivers. A Report Presented to the U.S. Fish and Wildlife Service Along With a Petition to list the western population of the gopher tortoise. ii + 126 pp.
Thieret, J. W. 1980. Louisiana Ferns and Fern Allies. Lafayette Natural History Museum and the University of Southwestern Louisiana. 123pp.
USDA (U.S. Department of Agriculture). 1978. Supplement to Forest Service Resource Bulletin 50-67. Mississippi South Region. 29 pp.
U.S. Fish and Wildlife Service. 1986. Endangered and Threatened Wildlife and Plants: Determination of Threatened Status for the Gopher Tortoise (*Gopherus polyphemus*). *Federal Register* 52(129): 25376-25380.
**U.S. Fish and Wildlife Service. 199O. Gopher Tortoise (*Gopherus polyphemus*) Recovery Plan. Prepared by Wendell A. Neal. U.S. Fish and Wildlife Service, Jackson, Mississippi. 28 pp.
Wright, S. 1982. The Distribution and Population of the Gopher Tortoise (*Gopherus polyphemus*) in South Carolina. Unpublished M.S. Thesis. Clemson University, Clemson, South Carolina. 74 pp.

Money Hill Tract Site Description

The project site is located in St. Tammany Parish in southeastern Louisiana, in Sections 26, 35 and 36 of Township 5 South, Range 12 East, and Section 1, Township 6 South, Range 12 E, about 5 miles southwest of Bush, LA. The proposed project is the construction of a paved road to connect the Money Hill subdivision north to LA. Highway 21. A majority of the proposed route is a dirt road near the western boundary of the Money Hill Plantation property. The site is one-quarter to one-half mile east of the upper reaches of Abita Creek, and crosses Coon Fork and Spanish Branch, small tributaries to Abita Creek. The right-of-way of the proposed project is 60 feet wide except for the entrance which is 100 feet wide for a distance of 200 feet. The entire project is 14,532 (2.75 miles) long.

The project site occurs in the rolling hills of the High Terraces geological formation, along a north-to-south-running ridge. Soils are predominantly very gently sloping and gently sloping moderately well-drained and well-drained fine sandy loams. Much of the area bordering the existing dirt road consists of periodically mowed bahia grass. The surrounding forest is young loblolly pine plantation.

There is little question that the great majority of the project site historically supported longleaf pine upland savannas that historically burned very regularly. A limited portion of the tract was probably historically characterized by small hardwood drains.

Survey dates & methods

The property was surveyed on 22 June 2012. The entire route of the proposed road was walked by Nelwyn McInnis of The Nature Conservancy, Mimi Dossett Goodyear of Money Hill Plantation, and Barbara Zelenka of J.V. Burkes, although McInnis was the primary surveyor. In addition, a buffer area of approximately 100 feet on each side of the proposed project was surveyed. If suitable habitat was found, the entire area was closely surveyed including well beyond the 100 foot buffer.

Gopher Tortoise Survey Methodology. Suitable habitat was surveyed for the distinctive gopher tortoise burrows. Suitable habitat was considered open herbaceous areas, open woodlands, edges of forests, trails, areas around hunting stands, and food plots. An eye was kept for animal paths in thicker areas that may indicate the presence of a tortoise. Gopher tortoises were located to the east nearly two miles away in the 1980s in Section 6, T6S, R13E. In 2004 and 2005, TNC conducted a survey for the Red-Cockaded Woodpecker and gopher tortoise at Money Hill; no additional burrows were found including none in the project area.

Louisiana Quillwort Survey Methodology. The two wetland drainages, Coon Fork and Spanish Branch, tributaries to Abita Creek, were encountered and surveyed within project boundary. In addition, portions of those drainages were spot-checked downstream well beyond the project site as well as sections of Abita Creek. Suitable habitat for LA Quillwort in Louisiana typically has a relatively firm, predominantly sandy substrate in relatively level areas (as opposed to steep banks) within the mean high water level of the stream. Steams are typically permanent, but can be intermittent. This observation comes from the author's from long experience in conducting surveys for this species as the endangered species botanist with the LA Natural Heritage Program as well as work with TNC.

Red-cockaded Woodpecker. A thorough search for RCW was conducted from 2004 to 2005 by The Nature Conservancy to determine a baseline for Money Hill prior to their entering into the Safe Harbor Program for RCW's in 2005. No RCWs were located and the baseline was set and remains at zero. That said, an eye was kept out for any

suitable nest pine tree (16 inches diameter breast height or greater), however none were found.

Findings

Current conditions found on site:

It is estimated the virgin longleaf pine timber was removed from this tract sometime between 1880 and 1900. In the 1940's much of the uplands in the area harvested again and planted in tongue-oil plantation. In the 1970's the area was converted to pine plantation. The area may have been subject to some control burns or occasional wild fire, and has experienced at least one timber harvest.

The overall aspect of the site is generally of a dense small-diameter 12 to 15 year old loblolly pine forest, with trees averaging about 30 feet tall and 6 – 12 inch dbh (diameter breast height) under which grows an almost continuous heavy brush across the site. A few scattered small openings with some herb cover are present. There are some scattered older trees approximately 40 years of age averaging about 50 feet tall and 16 – 20 inch dbh.

The midstory is poorly developed, but the understory is very dense, with many evergreen and deciduous shrubs, averaging 5 to 8 feet tall. Overall, brush cover is very heavy, with an estimated average 85% cover, and in many places near 100% cover. Understory species include yaupon (*Ilex vomitoria*), Japanese privet (*Ligustrum sinense*), beauty berry (*Callicarpa americana*), little-leaf gallberry (*Ilex glabra*), sweetgum (*Liquidambar styraciflua*), water oak (*Quercus nigra*), wax myrtle (*Myrica cerifera*), winged sumac (*Rhus alata*), tongue-oil (*Aluretes fordii*), trumpet creeper (*Campsis radicans*), pepper vine (*Ampelopsis arborea*), yellow jasmine (*Gelsemium sempervirens*), and Japanese climbing fern (*Lygodium japonica*). Several food plots are located along the dirt road and are weedy in nature, with bitterweed (*Helenium amarum*), yankee weed (*Eupatorium capillifolium*), blackberry (*Rubus* sp.), golden rod (*Solidago* sp.), and numerous other weedy species. Dense patches of cogon grass (*Imperata cylindrical*) are common and were mapped for future control.

No old/relic/gnarly pines were seen in the project area or buffer. Such old trees (generally $\geq$ 60 years of age) are typically key for an area to be habitable by RCW.

Because the site has received infrequent fire in recent years that has allowed a concomitant heavy woody understory to develop; the native ground cover is poorly developed. Relatively few native ground cover species are present, and most are present in the few scattered small openings on the site.

A small open wetland savanna was noted along the route that contained pipeworts (*Eriocaulon decangulare*), beak rushes (*Rynchospora* spp.), long-leaved milkweed (*Asclepias longifolia*), meadow beauty (*Rhexia virginica*), aster (*Aster* sp.), and Stoke's aster (*Stokesia laevis*). This area is too wet for gopher tortoise habitation. Two wetland

areas drainage areas were encountered. One apparently ephemeral site had rush (*Juncus* sp.), alnus (*Alnus serrulata*), joe-pye weed (*Eupatorium fistulosum*), panic grass (*Panicum scabriesculum*), spadeleaf (*Centella erecta*), and switchcane (*Arundinaria tecta*). The second drainage along Coon Fork contains bulrush (*Scirpus cyperinus*), cattails (*Typha* sp.), and paspy grass (*Paspalum urvilleii*). These areas were searched for LA Quillwort, however none were found.

Findings of Survey Regarding Louisiana Quillwort, Gopher Tortoise, and Red-cockaded Woodpecker

During this survey, **no evidence of inhabitation or use of this tract by Louisiana Quillwort, gopher tortoise, or Red-cockaded Woodpecker was found; however, Louisiana Quillwort was located about ¼ mile downstream along Abita Creek.**

LA Quillwort: The current condition of the project area is not highly suitable for the LA Quillwort. The upstream and downstream condition of Coon Fork shows it is an ephemeral stream and apparently not wet enough except in areas close to Abita Creek, which was not suitable for quillwort as it was silty and without a clear channel. Spanish Branch was wetter, however the substrate was also very silty and not typical of LA Quillwort habitat in Louisiana. A survey on the lower reaches of this stream did not result in any quillworts located.

A survey along Abita Creek on August 13, 2012, did yield 4 locations of plants in an approximately ½ mile stretch beginning just north of the confluence of Spanish Branch extending northward to just south of the confluence of Coon Branch. A search about ½ mile south of Spanish Branch yielded no additional quillworts. The area north of Coon Branch was not surveyed, as it would not be impacted by the proposed project. LA Quillworts have been located in the past from Abita Creek north of the new occurrences, at the intersection of LA Highway 21. A larger population of LA Quillwort occurs on TNC's Abita Creek Flatwoods Preserve about 3 miles downstream. The attached map of the project area shows the location of the new quillwort occurrences. All plants are located within 10 feet of Abita Creek. The GPS points indicate the creek is not accurately depicted on the topographic map in this area. Although the quillworts were found in different locations during this survey, due to their close proximity, one might consider them one population. Latitude and longitude positions are listed below with numbers of plants found from the total of 86 counted. Habitat associates found include an overstory and mid-story of swamp black gum (*Nyssa biflora*), sweetbay magnolia (*Magnolia virginiana*), and titi (*Cyrilla racemiflora*). Little understory was present; however St. John's wort (*Hpericum* sp.) was noted near one group of quillworts. Most occurrence areas had few plants other than the quillworts in the groundcover. The few species noted included beak rush (*Rhynchospora* spp.), spangle grass (*Chasmanthium*

laxum), yellow jasmine (*Gelsemium rankinii*), violet (*Viola primuliflora*), and the liverwort (*Pallavicenia lyellii*).

Latitude/Longitude Positions and Number of LA Quillworts on Abita Creek

1.	30degrees,33', 37.82" N	89 degrees, 57', 51.58" W	50 plants
2.	30degrees,33', 40.93" N	89 degrees, 57', 45.14" W	2 plants
3.	30degrees,33', 41.86" N	89 degrees, 57', 46.29" W	1 plant
4.	30degrees,33', 45.62" N	89 degrees, 57', 46.36" W	33 plants

Gopher Tortoise: Although the upland soils are suitable for gopher tortoise, the dense, young loblolly pine forest does not provide the open, grassy habitat needed by that species. There are, however, numerous niches for them in open areas along the dirt road, trails, and food plots, although none were located.

Red-cockaded Woodpecker: As previous surveys have indicated, the current condition of the habitat on this tract appears unsuitable for cavity trees that would support Red-cockaded Woodpecker roosting or nesting. Both Red-cockaded Woodpecker and gopher tortoise are animals of open, regularly burned pine forests, and most typically of longleaf pine woodlands with a well-developed grassy ground cover and general lack of brush.

Brief Vitae of Surveyor

Nelwyn McInnis is a professional biologist in Louisiana with a Bachelor of Science Degree in Wildlife Management and a Master of Science in Plant Taxonomy. She has worked over 20 years in the conservation field in Louisiana and Mississippi.