CITY OF DAPHNE
CITY COUNCIL WORK SESSION AGENDA
1705 MAIN STREET
DAPHNE, AL
MARCH 11, 2013
6:30 P.M.

1. **DISCUSS:** **LOW IMPACT ORDINANCE / ORDINANCE 2013-12 /ASHLEY CAMPBELL / ADRIENNE JONES / RICHARD JOHNSON / ROBERTS SWANN (MNEP)**

2. **DISCUSS:** **RULES OF PROCEDURE**

3. **DISCUSS:** **UPDATE ON HIGHWAY 64 AND COUNTY ROAD 13 ROUNDABOUT / RICHARD JOHNSON**

4. **DISCUSS:** **WHATEVER ELSE IS DEEMED NECESSARY**

5. **ADJOURN**

ORDINANCE 2013-12

LOW IMPACT

DEVELOPMENT

&

GREEN INFRASTRUCTURE

CITY OF DAPHNE, ALABAMA
ORDINANCE NO. 2013-12

Ordinance to Amend the City of Daphne
Land Use and Development Ordinance
Appendix O, Low Impact Development & Green Infrastructure

WHEREAS, the Planning Commission of the City of Daphne, Alabama at its regular meeting held on December 20, 2012, considered certain proposed amendments to the City of Daphne Land Use and Development Ordinance, Ordinance No. 2011-54, and any amendments to the same; and,

WHEREAS, after such consideration the Planning Commission sent a favorable recommendation to the City Council of the City of Daphne for the approval of said amendments to the City of Daphne Land Use and Development Ordinance; and,

WHEREAS, due notice of said proposed amendment has been provided to the public as required by law through publication and open display at the Daphne Public Library and City Hall, a public hearing was held before the City Council on February 18, 2013; and,

WHEREAS, the City Council of the City of Daphne after due consideration and upon recommendation of the Planning Commission, deemed that said amendments to the City of Daphne Land Use and Development Ordinance are proper and in the best interest of the health, safety and welfare of the citizens of the City of Daphne, Alabama; and,

NOW, THEREFORE, BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF DAPHNE, ALABAMA, as follows:

SECTION I. AMENDMENT

a. Table of Contents to said Ordinance shall be amended to include **Appendix O: Low Impact Development/Green Infrastructure (LID/GI) Project Application;**

b. Article 18-1(A) shall be amended to read in its entirety as follows:

18-1 GENERAL
A. Purpose:

The purpose of this section is to provide a guide for development wherein the ecological impacts to the environment are minimized through appropriate design, landscaping, erosion control, stormwater management, and proper planning. The intent of the City of Daphne is to protect valuable natural resources, the natural environment and the quality of life for all its citizens. In order to preserve the integrity, stability and the value of land, the City encourages the use of innovative, LEED-certified (Leadership in Energy and Environmental Design) and/or other "green" practices in development design. Where such methods/practices are proposed for a development said practices shall be designed in accordance with Appendix O, The Low Impact Development and Green Infrastructure Project application and certified by a credentialed professional in his/her design field.

c. Appendix O: Low Impact Development/Green Infrastructure (LID/GI) Project Application as attached to this Ordinance, shall be added to the Land Use Ordinance in its entirety.

All other sections, articles, and/or content of the City of Daphne Land Use and Development Ordinance shall remain the same and shall be unchanged by this Ordinance.

SECTION II: REPEALER.

All other City Ordinances or parts thereof in conflict with the provisions of this Ordinance, in so far as they conflict, are hereby repealed.

SECTION III: SEVERABILITY.

The provisions of this Ordinance are severable. If any provision, section, paragraph, sentence, or part thereof shall be held unconstitutional or invalid, such decision shall not affect or impair the remainder of said Ordinance, it being the legislative intent to ordain and enact each provision, section, paragraph, sentence, and part thereof separately and independently of each other.

SECTION IV: EFFECTIVE DATE.

This Ordinance shall take effect and be in force from and after the date of its approval by the City Council of the City of Daphne and after publication as required by law.

ADOPTED AND APPROVED BY THE CITY COUNCIL OF THE CITY OF DAPHNE, ALABAMA, THIS ____ day of _____, 2013.

THE CITY OF DAPHNE,
AN ALABAMA MUNICIPAL CORPORATION

_____
DANE HAYGOOD, MAYOR

ATTEST:

_____
REBECCA A. HAYES,
INTERIM CITY CLERK

Low Impact Development / Green Infrastructure (LID/GI)
Project Application

APPENDIX O

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1. Bioretention

Refer to Chapter 1 of Low Impact Development Guidebook, Phase I Edition V1.0, September 30, 2010.

2. Rainwater Harvesting

Refer to Chapter 2 of Low Impact Development Guidebook, Phase I Edition V1.0, September 30, 2010.

3. Constructed Stormwater Wetlands

Refer to Chapter 3 of Low Impact Development Guidebook, Phase I Edition V1.0, September 30, 2010.

4. Permeable / Porous Pavement

Refer to Chapter 4 of Low Impact Development Guidebook, Phase I Edition V1.0, September 30, 2010.

5. Riparian Buffers

5.1 Overview

Riparian buffer areas protect water quality by cooling water, stabilizing banks, mitigating flow rates, and providing for pollution and sediment removal by filtering overland sheet runoff before it enters the water. The Environmental Protection Agency defines buffer areas as, "areas of planted or preserved vegetation between developed land and surface water, [which] are effective at reducing sediment and nutrient loads." (SEMCOG, 2008)

5.2 Application and Limitations

Application	
Residential	Yes
Commercial	Yes
Industrial	Yes
Retrofit	Yes
Highway/Road	Limited
Recreational	Yes
Steep slopes	No
Shallow Water Table	Yes
Poorly Drained Soils	Yes

Considerations	
Construction Cost	Low/Med
Maintenance	Low
Soils	All
Sun/Shade	Sun/p. shade
Stormwater Quantity Function	Low/ Med
Stormwater Quality Function	High/Med High
Habitat	Med/high
Drainage area	Small/med
Space required	med

Benefits	Limitations
• Improves water quality; • Reduces runoff velocity and flow; • Enhances aesthetics, habitat; • Reduces shore/bank erosion; • Improves flood control; and • Reduces water temperature.	• Limited in reducing total runoff volumes; and • Size of lot and/ or project may reduce ability to protect riparian buffers.

Source: SEMCOG, 2008.

5.3 Design Considerations

Applicant shall consider the following when protecting the proper riparian buffer area width and related specifications:

- Existing or potential value of the resource to be protected,
- Site, watershed, and buffer characteristics,
- Intensity of adjacent land use, and
- Specific water quality and/or habitat functions desired.

Riparian buffers shall be divided into different zones that include vegetation to enhance the quality of the body of water.

<u>Zone 1</u>

Also termed the "streamside zone," shall begin at the edge of the stream bank of the active channel and extend a minimum distance of 50 feet (*City of Daphne Land Use & Development Ordinance Article 18-3 C(3)*), measured horizontally on a line perpendicular to the water body. Undisturbed vegetated area shall protect the physical and ecological integrity of the stream ecosystem. The vegetative target for the streamside zone is undisturbed native woody species with native plants forming canopy, understory, and duff layer. Where such forest does not grow naturally, native vegetative cover appropriate for the area (such as grasses, forbs, or shrubs) shall be installed.

Zone 2

Also termed the "middle zone," shall extend immediately from the outer edge of Zone 1 for a minimum distance of 55 feet (ADEM 20-100'). This managed area of native vegetation shall protects key components of the stream ecosystem and provide distance between upland development and the streamside zone. The vegetative target for the middle zone is either undisturbed or managed native woody species or, in its absence, native vegetative cover of shrubs, grasses, or forbs. Undisturbed forest, as in Zone 1, is encouraged strongly to protect future water quality and the stream ecosystem. Otherwise, native vegetative cover appropriate for the area (such as grasses, forbs, or shrubs) shall be installed.

Zone 3

Also termed the "outer zone," shall extend a minimum of 20 feet immediately from the outer edge of Zone 2. This zone prevents encroachment into the riparian buffer area, filters runoff from adjacent land, and encourages sheet flow of runoff into the buffer. The vegetative target for the outer zone shall consist of native woody and herbaceous vegetation to increase the total width of the buffer; native grasses and forbs are acceptable.

5.4 Maintenance

The following maintenance activities are required with riparian buffers:

Task	Frequency/Notes
Irrigation	Twice per week for 6 weeks after planting; continued as needed during severe drought.
Dead vegetation removal and replacement	Annual.
Check for streambank erosion or gullies	Annual, repair as needed.
Mowing of turfgrass	As needed, more often in summer months. Minimum 3-5", max 12".
Check for invasive / nonnative plants	Annual, remove as needed.
Mowing of native grasses	Annual, before new growth in spring.
Correction of wildlife damage	As needed.
Repair damaged fencing	As needed (as applicable).
Tree thinning	As needed. Those with >2" diameter should not be removed. Thinning shall not occur until proper tree density or cover is present.

6. Level Spreaders

6.1 Overview

Level spreaders promote infiltration and improve water quality by evenly distributing flows over a stabilized, vegetated surface. This allows for better infiltration and treatment. There are two types of level spreaders:

Inflow

Inflow level spreaders are meant to evenly distribute flow entering into another structural BMP, such as a filter strip, infiltration basin, or vegetated swale. Examples of this type of level spreader include concrete sills and earthen berms.

Outflow

Outflow level spreaders are intended to reduce the erosive force of high flows while at the same time enhancing natural infiltration opportunities. Examples of this second type include earthen berms and a level, perforated pipe in a shallow aggregate trench and flow reaches the spreader via the solid pipe. (SEMCOG, 2008).

6.2 Application and Limitations

Application	
Residential	Yes
Commercial	Yes
Industrial	Yes
Retrofit	Yes
Highway/Road	Yes
Recreational	Yes
Steep slopes	No
Shallow Water Table	No
Poorly Drained Soils	No

Considerations	
Construction Cost	Low
Maintenance	Low
Soils	sandy
Sun/Shade	Either
Stormwater Quantity Function	Low
Stormwater Quality Function	Low
Habitat	Med
Drainage area	Small
Space required	Large

Benefits	Limitations
• Low cost; • Wide applicability; • Ability to work with other BMPs in a treatment train; and • Avoids concentrated discharges and their associated potential erosion.	• Low stormwater benefits by itself; and • Careful construction and design required to function properly.

Source: SEMCOG, 2008.

6.3 Design Considerations

Level spreaders are considered a permanent part of a site's stormwater management system. Therefore, uphill development should be stabilized before any dispersing flow techniques are installed. If the level spreader is used as an erosion and sedimentation control measure, it must be reconfigured (flush perforated pipe, clean out all sediment) to its original state before use as a permanent stormwater feature. All contributing stormwater elements (infiltration beds, inlets, outlet control structures, pipes, etc) should be installed first. In addition, the following shall be implemented:

1. Provide as many outfalls as possible and avoid concentrating stormwater. This can reduce or eliminate the need for engineered devices to provide even distribution of flow.

2. Level spreaders are not applicable in areas with easily erodible soils and/or little vegetation. The slope below the level spreader shall be at a maximum eight percent in the direction of flow to discourage channelization. More gentle slopes (e.g., as low as one percent) are also acceptable.

3. The minimum length of flow after the level spreader (of the receiving area) shall be 15 feet.

4. Level spreaders shall not be constructed in uncompacted fill. Undisturbed virgin soil and compacted fill is much more resistant to erosion and settlement than uncompacted fill.

5. Most variations of level spreaders should not be used alone for sediment removal. Significant sediment deposits in a level spreader will render it ineffective. A level spreader may be protected by adding a forebay to remove sediment from the influent. This can also make sediment cleanout easier.

6. Perforated pipe used in a level spreader may range in size from 4-12 inches in diameter. The pipe is typically laid in an aggregate envelope, the thickness of which is left to the discretion of the engineer. A deeper trench will provide additional volume reduction and shall be included in such calculations. A layer of nonwoven geotextile filter fabric shall separate the aggregate from the adjacent soil layers, preventing migration of fines into the trench.

7. The length of level spreaders is primarily a function of the calculated influent flow rate. The level spreader shall be long enough to freely discharge the desired flow rate. At a minimum, the desired flow rate shall be that resulting from a 10-year design storm. This flow rate shall be safely diffused without the threat of failure (i.e., creation of erosion, gullies, or rills). Diffusion of the storms greater than the 10-year storm is possible only if space permits. Generally, level spreaders should have a minimum length of 10 feet and a maximum length of 200 feet.

8. Conventional level spreaders designed to diffuse all flow rates shall be sized based on the following:
   - For grass or thick ground cover vegetation:
     - 13 linear feet of level spreader for every one cubic feet per second (cfs)
     - Slopes of eight percent or less from level spreader to toe of slope
   - For forested areas with little or no ground cover vegetation:
     - 100 linear feet of level spreader for every one cfs flow
     - Slopes of six percent or less from level spreader to toe of slope

     For slopes up to 15 percent for forested areas and grass or thick ground cover, level spreaders may be installed in series. The above recommended lengths should be followed.

9. The length of a perforated pipe level spreader may be further refined by determining the discharge per linear foot of pipe. A level spreader pipe should safely discharge in a distributed manner at the same rate of inflow, or less. If the number of perforations per linear foot (based on pipe diameter) and average head above the perforations are known, then the flow can be determined by the following equation:

   Where: $L = Q_P/Q_L$
   L = length of level spreader pipe (ft.)
   QP = design inflow for level spreader (cfs)
   QL = level spreader discharge per length (cfs/ft.)
   AND $Q_L = Q_O \times N$
   Where:
   Q_L = level spreader discharge per length (cfs/ft.)
   Q_O = perforation discharge rate (cfs.)
   N = number of perforations per length of pipe, provided by manufacturer based on pipe diameter (#/ft)
   AND $Q_O = C \times A \times \sqrt{2gH}$
   Where:
   Q_O = perforation discharge rate (cfs)
   Cd = Coefficient of discharge (typically 0.60)
   A = Cross sectional area of one perforation (ft^2)
   g = acceleration due to gravity, 32.2 ft./sec^2
   H = head, average height of water above perforation (ft.) (provided by manufacturer)

10. Flows may bypass a level spreader in a variety of ways, including an overflow structure or upturned ends of pipe. Cleanouts/overflow structures with open grates can also be installed along longer lengths of perforated pipe. Bypass may be used to protect the level spreader from flows above a particular design storm.

11. Erosion control matting, compost blanketing, or riprap on top of filter fabric shall be implemented immediately downhill and along the entire length of the level spreader, particularly in areas that are unstable or have been recently disturbed by construction activities. Generally, low flows that are diffused by a level spreader do not require additional stabilization on an already stabilized and vegetated slope.

6.4 Maintenance

The following maintenance activities are required with level spreaders:

Task	Frequency/Notes
Inspect diverter box, clean and make repairs	Monthly and after rainfall >2". Look for clogged inlet/outlet pipes and trash/debris in box.
Inspect forebay and level spreader, clean and make repairs	Monthly and after rainfall >2". Look for: • Sediment in forebay and along level spreader lip; • Trash and/or leaf buildup; • Scour, undercutting; • Settlement of structure (see silt downhill below spreader) • Fallen trees; and • Stone from below the spreader lip washing downhill.
Inspect the filter strip and the bypass swale and make repairs as needed	Monthly and after rainfall >2". Look for: • Damaged turf reinforcement or riprap rolling downhill; • Erosion within the buffer or swale; and • Gullies or sediment flows from concentrated flows downhill of level spreader.
Remove any weeds or shrubs growing on level spreader or in swale	Annual.

7. Maximize Native Plants / Minimize Sod

7.1 Overview

The goal of utilizing and maximizing native plants while minimizing sod area in the landscape is set forth to:

- Improve developed green space as habitat
- Improve water quality
- Lessen water consumption, and
- Reduce long-term maintenance costs.

This goal is applicable to all landscape/green space requirements set forth currently by the Zoning Ordinance of the City of Daphne. This allows for space that is already allocated as green space to achieve additional performance benefits through the use of LID techniques.

7.2 Application and Limitations

Application	
Residential	Yes
Commercial	Yes
Industrial	Yes
Retrofit	Yes
Highway/Road	Yes
Recreational	Yes
Steep slopes	Yes
Shallow Water Table	Yes
Poorly Drained Soils	Yes

Considerations	
Construction Cost	Low/Med
Maintenance	Low
Soils	All
Sun/Shade	All
Stormwater Quantity Function	Med/High
Stormwater Quality Function	Med/High
Habitat	High
Drainage area	All
Space required	N/A

Benefits	Limitations
• Improves water quality; • Reduces runoff velocity and flow; • Enhances aesthetics, habitat; • Lessens fertilizer usage and subsequent runoff; and • Reduces maintenance requirements over time, thereby reducing pollution, etc.	• Limited where open field recreation and/or land uses are required; and • Projects with phased construction or large lots that would normally employ turfgrass will incur higher front end costs.

7.3 Design Considerations

When utilizing this method, a sequence of performance criteria shall be met as follows:

- First, the required landscape/green space area for the project shall be a maximum of 20% turfgrass. This satisfies the "Minimize Sod" goal of the credit.
- Second, the 80% balance of the landscape/green space area for the project shall be planting area. Planting area is defined as a planting space that has trees, shrubs, groundcover, and other plants that are located within a bed area that has a reasonable continuous organic mulch layer throughout.
- Finally, within the planting area, 70% of the area shall utilize native plant species. The native species shall be designated as such in the plant schedule on the required landscape planting plan for the project. The City reserves the right to reject a species submitted as "native" at its discretion.

A landscape plan implementing this method shall include a landscape area diagram that shows sod area vs. native species planting area vs. ornamental species planting area for the site with percentage calculations included. Note: Include prohibition on invasive species? References list source.

7.4 Maintenance

The following maintenance activities are required when this technique is employed:

Task	Frequency/Notes
Irrigation	Deep, frequent irrigation to supplement inadequate rainfall is needed in the first year of planting. After this, irrigation should only be needed during extended drought periods if at all.
Dead vegetation removal and replacement	Periodic, as needed for aesthetics.
Mowing of turfgrass	As needed, more often in summer months.
Check for invasive / nonnative plants	Remove as needed.
Correction of wildlife damage	As needed.

8. Swales / Dry Swales

8.1 Overview

A swale is a narrow, gently sloping landscaped depression that collects and conveys stormwater runoff. The densely planted swale filters stormwater as it flows the length of the structure and allows infiltration of water into the ground. The swale discharges to a storm sewer or other approved discharge point. Compared to vegetated swales, LID/GI swales may be shorter and narrower, but require deeper levels of amended soil and a subsurface drain rock layer to compensate for the smaller size and to function effectively (Clean Water Services, et. al, 2009).

8.2 Application and Limitations

Application	
Residential	Yes
Commercial	Yes
Industrial	Yes
Retrofit	Limited
Highway/Road	Yes
Recreational	Yes
Steep slopes	Yes
Shallow Water Table	Yes
Poorly Drained Soils	Yes

Considerations	
Construction Cost	Low
Maintenance	Low
Soils	Any
Sun/Shade	Any
Stormwater Quantity Function	Low/med
Stormwater Quality Function	Medium
Habitat	Low
Drainage area	Small
Space required	Low

Benefits	Limitations
• Can replace curb and gutter for site drainage and provide significant cost savings; • Water quality; and • Peak and volume control with infiltration.	• Limited application in areas where space is a concern; and • Unless designed for infiltration, there is limited peak and volume control.

Source: Clean Water Services, et. al, 2009 and SEMCOG, 2008.

8.3 Design Considerations

The following design factors shall be considered when implementing this methodology:

Sizing

The size of the swale shall depend upon the infiltration rate of existing soils. A sizing factor of 0.06 assumes the site infiltration rate is less than 2 in/hr. For example, the size of a swale managing 1,500 square feet of total impervious area would be 90 square feet (1,500 x 0.06). Size may be decreased if:

- Demonstrated infiltration rate is greater than 2 in/hr using ASTM D3395-09 method; or
- Amended soil depth is increased.

Geometry/Slopes

A swale's slope end to end shall be at least 0.5% and no more than 6%. For sites with steeper slopes, check dams may be incorporated into the design. Side slopes from the bottom to the top of the swale shall be 3:1 or less. The minimum bottom width shall be 2 feet with a minimum depth of 1 foot.

Piping for LIDA Swales

If needed, stormwater may be directed from impervious surfaces to swales by piping per plumbing code requirements, or may flow directly into the swale via curb openings. A LID/GI swale shall have no underdrain. An overflow drain shall allow no more 6 inches of water depth to collect in the swale. The overflow drain and piping must meet plumbing code requirements and direct excess stormwater to an approved disposal point.

Setbacks

The City of Daphne Land Use & Development Ordinance site-specific setback requirements shall apply.

Soil Amendment/Mulch

Amended soils with appropriate compost serve numerous benefits: infiltration; detention, retention; better plant establishment and growth; reduced summer irrigation needs; reduced fertilizer need; increased physical/chemical/microbial pollution reduction; and reduced erosion potential. Primary treatment shall occur in the top 18 inches of the swale. Amended soil in the treatment area shall be composed of imported soil, mix of one part organic compost, one part gravelly sand, and one part top soil. Compost shall be weed-free, decomposed, non-woody plant material; animal waste is not allowed. Water velocities and potential erosion shall be reduced by providing energy dissipaters such as river rock at entrances to the swale. Check with the District or local jurisdiction for Seal of Testing Approval Program (STA) Compost provider – Chad checking into this. To avoid erosion, appropriate erosion control BMPs shall be implemented.

Vegetation

The entire swale area including side slopes and treatment areas shall be planted with vegetation appropriate for the soil conditions. Planting conditions vary from wet to relatively dry within the swale. The flat bottom will be inundated frequently and shall be planted with species such as rushes, sedges, perennials, ferns, and shrubs well-suited to wet-to-moist soil conditions. The side slope moisture gradient varies from wet at the bottom to relatively dry near the top where inundation rarely occurs. The moisture gradient will vary depending upon the designed water depth, the swale depth, and side slope steepness. The transition zone from the bottom of the swale to the designed high water line or top of freeboard shall be planted with sedges, rushes, perennials, ferns, and shrubs that can tolerate occasional standing water and wet-to-moist planting conditions. The areas above the designed high water line and immediately adjacent to the swale will not be regularly inundated and shall be planted with self-sustaining, low maintenance grasses, perennials, and shrubs suitable for the local climate and site.

Native plants are encouraged, but appropriate, noninvasive ornamentals are acceptable for aesthetic and functional value. All vegetation should be densely and evenly planted to ensure proper hydrological function of the swale.

Quantities:

Bottom of the swale (wet-to-moist zone, per 100 sf) shall include at a minimum:

- 115 herbaceous plants, 1' on center spacing, ½-gal container size; or
- 100 herbaceous plants, 1' on center, and 4 shrubs, 1-gal container size, 2' on center

Side slopes and top of the swale (wet-to-moist transition zone and dry zone) shall include at a minimum:

- 1 tree per 300 sq. ft, minimum 2-gal container size by 2 ft-tall and
- 10 shrubs (1-gal) and 70 groundcovers (½-gal) per 100 sf

Side slope trees shall be selected by adaptability to wet-to-moist conditions and size at maturity. An area twice the width of the tree rootball and the depth of the rootball plus 12" (or total depth of 30", whichever is greater) shall be backfilled with amended soil for optimal growth, with no sub-surface rock layer (Clean Water Services, et. al, 2009.)

8.4 Maintenance

The following maintenance activities are required with swales:

Task	Frequency/Notes
Irrigation	As needed, water efficient irrigation shall be applied for the first two years after construction of the facility, particularly during the dry summer months, while plantings become established. Irrigation after two years is at the discretion of the owner.
Landscape maintenance (replanting and nonnative species removal).	At least twice annually, in spring and fall, evaluate and replant as necessary to ensure a minimum of 80% survival rate of the required vegetation and 90% facility coverage. Remove nonnative, invasive plant species when found in the facility. Design swales so that they do not require mowing.
Debris removal	At least twice annually, in spring and fall, remove garbage, landscaping debris and other material that may impede water flow and clog the system.
Structural inspection and maintenance	At least twice annually, in spring and fall, Check inlet pipes and outlet structure for damage or missing pieces. Inlet pipes and outlet structures shall be free of obstructions and heavy vegetation.

Note: If public, the permittee is responsible for the maintenance of the swale for a minimum of two years following construction and acceptance of the facility. All publicly maintained facilities not located in the public right-of-way must have a public easement. If private, the property owner is responsible for ongoing maintenance per a recorded maintenance agreement (Clean Water Services, et. al, 2009).

9. Sand Filter/Oil and Grit Separation

9.1 Overview

Constructed filters are structures or excavated areas containing a layer of sand, compost, organic material, peat, or other media that reduce pollutant levels in stormwater runoff by filtering sediments, metals, hydrocarbons, and other pollutants. Constructed filters are suitable for sites without sufficient surface area available for bioretention.

9.2 Application and Limitations

Application	
Residential	Limited
Commercial	Yes
Industrial	Yes
Retrofit	Yes
Highway/Road	Yes
Recreational	Yes
Steep slopes	n/a
Shallow Water Table	n/a
Poorly Drained Soils	n/a

Considerations	
Construction Cost	Med/high
Maintenance	High
Soils	n/a
Sun/Shade	n/a
Stormwater Quantity Function	Low/high*
Stormwater Quality Function	High/med /low (temp)
Habitat	n/a
Drainage area	Max 5 acre
Space required	low

Benefits	Limitations
• Good water quality performance; • Variations for different applications; and • Can be effective pretreatment for other BMPs.	• Limited water quantity benefits; • Relatively high cost; and • High maintenance needs.

*Function is low without infiltration and increases when infiltration is provided. Source: SEMCOG, 2008.

9.3 Design Considerations

The following design factors shall be considered when implementing this methodology:

1. All constructed filters shall be designed so that larger storms may safely overflow or bypass the filters. Flow splitters, multi-stage chambers, or other devices may be used. A flow splitter may be necessary to allow only a portion of the runoff to enter the filter. This would create an "off-line" filter, where the volume and velocity of runoff entering the filter is controlled. If the filter is "on-line", excess flow shall be designed to bypass the filter and continue to another water quality BMP.

2. Entering velocity shall be controlled. A level spreader may be used to spread flow evenly across the filter surface during all storms without eroding the filter material. Level spreaders for this purpose should use a concrete lip or other non soil material to avoid clogging as a result of failure of the level spreader lip. Parking lots may be designed to sheet flow into filters. Small rip-rap or landscaped riverstone edges may be used to reduce velocity and distribute flows more evenly.

3. Contributing areas shall be stabilized with vegetation or other permanent soil cover before runoff enters filters. Permanent filters shall not be installed until the site is stabilized. Excessive sediment generated during construction can clog the filter and prevent or reduce the anticipated post construction water quality benefits.

4. Pretreatment may be necessary in areas with especially high levels of debris, large settled particulates, etc. Pretreatment may include a forebay, oil/grit separators, vegetated filter strips, or grass swales. These measures will settle out the large particles and reduce velocity of the runoff before it enters the filter. Regular maintenance of the pretreatment is critical to avoid wastes being flushed though and causing the filter to fail.

5. There shall be sufficient space (head) between the top of the filtering bed and the overflow of the filter to allow for the maximum head designed to be stored before filtration.

6. The filter media may be a variety of materials (sand, peat, GAC, leaf compost, pea gravel, etc.) and in most cases should have a minimum depth of 18 inches and a maximum depth of 30 inches, although variations on these guidelines are acceptable if justified by the designer. Coarser materials allow for greater hydraulic conductivity, but finer media filter particles of a smaller size.

   Sand has been found to provide a good balance between these two criteria, but different types of media remove different pollutants.

   The filter media shall have a minimum hydraulic conductivity (k) as follows:
   - Sand 3.5 feet/day;
   - Peat 2.5 feet/day; and
   - Leaf compost 8.7 feet/day.

   Depending on the characteristics of the stormwater runoff, a combination of filter materials will provide the best quality results. In addition to determining the degree of filtration, media particle size determines the travel time in the filter and plays a role in meeting release rate requirements.

7. A gravel layer at least six inches deep is required beneath the filter media.

8. Underdrain piping shall be four-inch minimum (diameter) perforated pipes, with a lateral spacing of no more than 10 feet. A collector pipe can be used, (running perpendicular to laterals) with a slope of one percent. All underground pipes shall have clean-outs accessible from the surface. Underdrain design must minimize the chance of clogging by including a pea gravel filter of at least three inches of gravel under the pipe and six inches above the pipe.

9. Infiltration filters shall be underlain by a layer of permeable nonwoven geotextile.

10. A total drawdown time of not more than 72 hours is recommended for constructed filters, though the surface should drawdown between 24 and 48 hours. The drawdown time can be estimated using the filter surface area and the saturated vertical infiltration rate of the filter media. If the storage does not drawdown in the time allowed, adjust pretreatment depth, filter media depth, and surface area. Adjust the design until the volume (if applicable) and drainage time constraints are met.

11. The filter surface area may be estimated initially using Darcy's Law, assuming the soil media is saturated:

    $A = V \times d_f / [k \times (h_f + d_f) \times t_f]$, where:

    A = Surface area of filter (square feet)
    V = Water volume (cubic feet)
    d_f = Depth of filter media (min 1.5 ft; max 2.5 ft)
    t_f = Drawdown time (days), not to exceed 3 days
    h_f = Head (average head in ft; typically ½ the maximum head on the filter media, which is typically ≤ to 6 ft)
    k = Hydraulic conductivity (ft/day)

12. For vegetated filters, a layer of nonwoven geotextile between non-organic filter media and planting media shall be required.

9.4 Maintenance

The following maintenance activities are required with sand filter/oil and grit separation:

Task	Frequency/Notes
Filter media inspection and maintenance, replacement as necessary	Four times per year. Check for accumulated sediment in pore space, and reduced hydraulic conductivity. Symptoms include: • Standing water – any water left in a surface filter after the design drain down time indicates the filter is not functioning according to design criteria. • Film or discoloration of any surface filter material – this indicates organics or debris have clogged the filter surface.
Remove trash and debris	Four times per year
Rake scrape silt if collected on top of the filter	Four times per year
Till and aerate filter area	Four times per year
Replenish filtering medium	Four times per year, if scraping/removal has reduced depth of filtering media
Repair leaks from the sedimentation chamber or deterioration of structural components	Four times per year
Clean out accumulated sediment from filter bed chamber and/or sedimentation chamber	Four times per year
Clean out accumulated sediment from underdrains	Four times per year

Note: In areas where the potential exists for the discharge and accumulation of toxic pollutants (such as metals), filter media removed from filters must be handled and disposed of in accordance with all state and federal regulations.

10. Green Roofs

10.1 Overview

A green roof (or ecoroof) is a lightweight vegetated roof system with waterproofing material, drainage, growing medium, and specially selected plants. A green roof can reduce site impervious area and manage stormwater runoff. Green roofs reduce peak runoff to near predevelopment rates and reduce annual runoff volume by at least 50% (Cost Benefit Evaluation of Ecoroofs, Portland Bureau of Environmental Services, 2008). Green roofs also help mitigate runoff temperatures by keeping roofs cool and retaining most of the runoff in dry seasons. Green roofs typically have thin layers of lightweight growing medium (4 to 8 inches) and low growing succulent vegetation. Alternatively, roof gardens that are designed to be walked on have deeper soils (8+ inches) and are more heavily planted. Professional design consultation is necessary to ensure the structural requirements of building codes are met. Green roofs must be low maintenance and use irrigation only to sustain the health of vegetation.

10.2 Application and Limitations

Application	
Residential	Yes
Commercial	Yes
Industrial	Yes
Retrofit	No
Highway/Road	n/a
Recreational	n/a
Steep slopes	n/a
Shallow Water Table	n/a
Poorly Drained Soils	n/a

Considerations	
Construction Cost	Varies
Maintenance	Moderate/ high
Soils	n/a
Sun/Shade	Sun
Stormwater Quantity Function	Varies
Stormwater Quality Function	Good
Habitat	Good
Drainage area	Roof Size
Space required	Small

Benefits	Limitations
• Increased energy efficiency; • Improved air quality; • Reduced temperatures in urban areas; • Noise reduction; • Improved aesthetics; • Extended roof life; and • Improved stormwater management.	• Complex engineering and design factors, • Higher initial cost than conventional; • Climate limitations; and • Potentially costly repairs.

Source: Clean Water Services, et. al, 2009 and SEMCOG, 2008.

10.3 Design Considerations

Sizing

Green roofs replace impervious area at a 1:1 ratio. They shall not receive water from other impervious areas such as an adjacent conventional roof.

Slope

Maximum roof pitch is 4:12 (3H:1V slope) unless the applicant provides documentation of runoff retention and erosion control on steeper slopes.

Waterproofing

On the roof surface a waterproofing material such as modified asphalt, synthetic rubber, or reinforced thermal plastics is required. Waterproofing materials also may act as a root barrier. Waterproof membranes shall be thoroughly tested to identify and remedy potential defects and leaks prior to installation of any green roof components.

Protection boards or materials (recommended)

These materials protect the waterproof membrane from damage and are usually made of soft fibrous materials. They may be required to maintain the waterproofing warranty, depending on the membrane used. Consult with roofing manufacturer for requirements.

Ballast (optional)

Gravel ballast may be placed along the roof perimeter and at air vents or other vertical elements to separate roofing elements and vegetation. The need for ballast depends on the type of roof and rooftop flashing details. Ballast or rooftop pavers may be used to provide access, especially to vertical elements that require maintenance.

Header/separation board (optional)

If needed, a header or separation board may be placed between gravel ballast and soil or drains.

Root barrier

A root barrier may be required, depending on the waterproofing material, warranty requirements, and the types of vegetation proposed. Root barriers impregnated with pesticides, metals, or other chemicals that could leach into stormwater shall not be applied unless documentation that leaching does not occur is provided. If a root barrier is used it must extend under any gravel ballast and the growing medium, and up the side of any vertical elements.

Drainage

A method of drainage shall allow excess water to flow into drains when soils are saturated. A manufactured drain mat, filter fabric, aggregate or gravel layers, or the growing medium itself may be used if water drains when soils are saturated. The green roof shall have an approved discharge location and drain or drains.

Growing medium

The growing medium depth is 3 to 4 inches or more, depending on the project. This material shall be lightweight and provide a good base for plant growth. Mixes range from 5% organic/95% inorganic to 30% organic/70% inorganic, depending on specific vegetation needs. Growing media shall be stable over time and not break down into fine particles that might increase compaction and clog drainage layers. Components include pumice, perlite, paper pulp, digested organic fiber, and water retention components such as expanded slate, diatomaceous earth, or polymers. For growing media specification, include all constituent elements and their percent composition, and a saturated weight per cubic foot (pcf) that has been tested by a third party lab.

Vegetation and coverage

Green roof vegetation traits:

- Adapted to seasonal drought, excess heat, cold and high winds and other harsh conditions;
- Fire resistant;
- Requires little or no irrigation once established;
- Predominately self-sustaining, low maintenance, with minimal fertilizer;
- Perennial or self-sowing annuals that are dense and mat-forming; and
- Diverse palette to increase survivability and good coverage.

Examples of appropriate species: Sedum, ice plant, blue fescue, sempervivum and creeping thyme. Other herbs, forbs, grasses, and low groundcovers can provide additional benefits and aesthetics, but may need more watering and maintenance to survive and may be prone to additional fire risk if allowed to dry out. Planting lists shall be City-approved and based on reliable sources from this region including local growers and plant suppliers.

Species shall achieve 90% plant coverage within the 2 year maintenance period. At least 70% of the green roof should be evergreen species. No more than 10% of the green roof may be non-vegetated components such as gravel ballast or pavers for maintenance access. Mechanical units may protrude through the green roof, but are not considered elements of the green roof and may be removed from square foot totals.

Exposed areas during establishment periods shall be mulched with an approved, biodegradable mesh blanket, straw, gravel, and pebbles or pumice to protect exposed soil from erosion.

10.4 Maintenance

The following maintenance activities are required with sand filter/oil and grit separation:

Task	Frequency*/Notes
Remove drain debris	Monthly during rainy season.
Remove dead plants and replant	As needed in spring and fall to maintain the required 90% plant coverage.
Remove weeds and undesirable plant growth	During first growing season monthly, and in late spring and early fall in subsequent years.
Fertilization	As needed, non-chemical, organic and slow release as approved by the City of Daphne.
Weed/pest abatement	Pesticides and herbicides of any kind are prohibited, unless approved by the City of Daphne to contain a detrimental outbreak of weeds or other pests.
Irrigation	As needed, minimal irrigation may be necessary to maintain vegetation health and ecological function of green roofs. Harvested rainwater is highly recommended for irrigation. Green roofs larger than 1,000 square feet should have an automatic irrigation system for more efficient coverage and to eliminate the need for hand watering. Those larger than 5,000 square feet also should have an irrigation flow meter to monitor water usage.

*The level of maintenance will vary depending on soil depth, vegetation type, and location.

References:

Brantley, Eve (Auburn University) Dylewski, Katie (Auburn University), Roberts, Jess (Auburn University), Shelton, Michael (Weeks Bay National Estuarine Research Reserve). September 30, 2010. Low Impact Development Guidebook, Phase I Edition V1.0.

SEMCOG (Southeast Michigan Council of Governments Information Center. www.semcog.org) and Michigan Department of Environmental Quality. Low Impact Development Manual For Michigan. A Design Guide for the Implementers and Reviewers. 2008.

Clean Water Services, Tualatin Basin Natural Resources Coordinating Committee's Public Education and Outreach Committee, and Oregon Department of Environmental Quality (DEQ). July 2009. Low Impact Development Approaches Handbook.

Low Impact Development / Green Infrastructure (LID/GI)
Project Application

Applicant: _____ Project Name: _____

____ *LID/GI Techniques have been considered for this project but are not being implemented for the following reason(s)* _____

____ *LID/GI Techniques and have been considered and are being implemented in exchange for incentives as requested below. Plans illustrating proposed technique are included in submittal package.*

Selected ✓	LID/GI Technique*	Point Value	Applicant's Description of Technique *(including scale/ extent of use in project)*	Reference Plan Sheet	Points Requested
	Bioretention	7			
	Constructed Stormwater Wetlands	7			
	Permeable / Porous Pavement	4			
	Riparian Buffers	7			
	Level Spreaders	5			
	Maximize Native Plants / Minimize Sod	5			
	Swales / Dry Swales	3			
	Rainwater Harvesting	4			
	Sand Filter / Oil and Grit Separation	4			
	Green Roofs	1			

*Refer to Appendix O for LID/GI technique requirements.

Total Technique Points: _____

Low Impact Development / Green Infrastructure (LID/GI)
Project Application (Continued)

Selected (✓)	Incentive Description	Final Point Value	Points Used
	Reduced parking requirements Option A _____		
	Reduced parking requirements Option B _____		
	Waived permit fees		
	Reduced permit fees		

Total Technique Points: _____

Note: Total technique points must be greater than or equal to total incentive points.

_____ I certify that all of the LID/GI techniques and incentives have been analyzed and selected, as applicable, for the design of this project as indicated above. I also certify that the techniques selected, as applicable, will be implemented for this project as referenced on Plan Sheets provided in the application package.

_____

Signature of Applicant/Authorized Agent Date

RULES

OF

PROCEDURE

CITY OF DAPHNE
ORDINANCE 2012-63

AN ORDINANCE ADOPTING THE RULES OF PROCEDURE IN ALL INSTANCES FOR MEETINGS OF THE CITY COUNCIL

BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF DAPHNE, ALABAMA that the Order Procedure in All Instances for Meetings of the City Council shall be as follows:

SECTION I:

That the Rules of Procedure herein contained shall govern the deliberations and meetings of all of the Council of the City of Daphne, Alabama.

SECTION II:

That the regular meetings of the City Council shall be held on the first and third Mondays of each month, which meeting shall convene at 6:30 p.m. at the City Hall Council Chamber and all meetings, regular and special, shall be opened to the public, except when Council meets in executive session as authorized by State law. The regularly scheduled work session will be held on the Monday between the first and second council meeting at 6:30 p.m. at the City Hall Council Chambers. Items for the agenda must be turned in by 5:00 p.m. on the Wednesday before the council meeting and work session.

SECTION III:

That special meetings may be held at the call of the presiding officer by serving notice on each member of the Council not less than twenty-four hours before the time set for such special called meeting. All special meetings may be held as provided by Section 11-43-50 Code of Alabama, 1975 (as amended). Furthermore, any two (2) Council members shall have the right to call for a special meeting. Notice of all special meetings shall be posted on the council approved bulletin board and appropriate customary media notified, and shall be accessible to the public twenty-four hours prior to such scheduled meeting.

SECTION IV:

A Quorum shall be determined as provided by Section 11-43-40, Code of Alabama, 1975, (as amended).

SECTION V:

That the order of business of each council meeting shall be as follows:

1. Call to Order

2. Roll Call/Invocation/Pledge of Allegiance

3. Approval of the Minutes of the Previous Meeting(s)

4. Reports of Standing Committees:
   - Finance Committee
   - Building/Property Committee
   - Code Enforcement/Ordinance Committee
   - Public Safety
   - Public Works/Solid Waste Committee

5. Reports of Special Boards and Commissions
   - Board of Zoning Adjustment
   - Downtown Redevelopment Authority
   - Industrial Development Board
   - Library Board
   - Planning Commission
   - Recreation Board
   - Utility Board

6. Report of Officers:
   a. Mayors Report
   b. City Attorney Report
   c. Department Heads Report

7. Public Participation

8. Resolution, Ordinances and Other Business

9. Council Comments

10. Adjournment

SECTION VI:

That any item including all background material to be placed on agenda must be turned in by 5:00 p.m. on the Wednesday before the council meeting to the City Clerk subject to the review of the Council President. The council packet will be sent to the full City Council by 12:00 p.m. Friday before the City Council Meeting.

SECTION VII:

That no member shall speak more than twice on the same subject without permission of the presiding officer, and after all other council members have had the opportunity to speak.

SECTION VIII:

That no individual who is not a member of the City Council or the Mayor shall be allowed to address the same while in session without permission of the presiding officer and for not more than three (3) minutes, unless approved by the presiding officer. No person shall be allowed to address the Council on any matter which shall be the subject of a public hearing scheduled by the Council until the meeting under which the public hearing on that matter is scheduled to be heard. An individual wishing to speak to the council with permission of the Council President or Presiding Officer will be allowed 5 minutes. The individual must provide in writing a synopsis of the topic to be discussed. This synopsis is to be delivered to the City Clerk by the Wednesday before the council meeting at 5:00 p.m.

SECTION IX:

That those motions to reconsider must be made by a council member who voted with the majority at the same or next succeeding meeting of the Council.

SECTION X:

That whenever it shall be required by one or more members the "ayes" and the "nays" shall be recorded and any member may call for a division on any question.

SECTION XI:

That all questions of order shall be decided by the presiding officer of the Council with the right of appeal to the full Council.

SECTION XII:

That the presiding officer of the Council may, at his or her discretion, call any members to take the chair to allow him or her to address the Council or make a motion or discuss any other matter at issue.

SECTION XIII:

That motions to lay any matter on the table shall be first in order, and on all questions, the last amendment, the most distant day, and the largest financial sum shall be first put.

SECTION XIV:

That Council may meet in executive session only for purposes authorized by State law. When a council person makes a motion for executive session for an enumerated purpose, the presiding officer shall put the motion to vote. If the majority of the council shall vote in favor of the Motion for executive session the body shall then move into executive session for discussion of the matter for which executive session was called. No action may be taken in an executive session. When the discussion has been completed, the council shall resume its deliberations in public.

SECTION XV:

That a motion for adjournment shall always be in order.

SECTION XVI:

That the rules of the Council may be amended in the same manner as any other ordinance of general or permanent nature.

SECTION XVII:

That the rules of the Council may be temporarily suspended by unanimous vote of all members present.

SECTION XVIII:

That the chair of each respective committee, or the council member acting for him or her, shall submit and make report to the Council when so requested by the presiding officer or any member of the Council.

SECTION XIX:

That all ordinances, resolutions or propositions submitted to Council which require the expenditure of money will lie over until the next Council meeting; provided that such ordinance, resolution or propositions may be considered earlier by unanimous consent of the Council members present at such meeting by roll call vote and provided further that this rule shall not apply to the current expenses of, or contracts previously made with, or regular salaries of officers, or wages of employees of the City.

SECTION XX:

That all motions, resolutions, ordinances or other business required to be in writing shall be prepared and supplied to all Council members by twelve noon one full city work day before the Council meeting in which it is to be presented. (e.g. if City offices are not open, the Friday before the Monday council meeting, then the writings and documentation shall be supplied to each city council member by placing same in each member's mailbox at City Hall by noon Thursday.)

a. It is desired that information be supplied to the City Clerk in time to be made part of the agenda packet.

b. When a work session is called or scheduled between two council meetings, all motions, resolutions, ordinances or other business required to be in writing shall be presented in substantially the same form as that which is required for presentation at council meeting.

c. Notwithstanding Sections a. and b., hereinabove, in the situation of an actual emergency sections a. and b., hereinabove, shall not apply. For purposes herein an actual emergency exist from failure to act will result in an immediate and irrefutable harm to the City or any of its citizens and or otherwise it was physically impossible to comply with notice requirements set forth herein as the same may be determined by the presiding officer of the Council.

SECTION XXI:

That the City Clerk, City Engineer, City Attorney, Chief of Police and Fire Chief and such other officers and employees shall attend all meetings of the City Council, and shall otherwise remain in the Council Chamber for such length of time as the Council, presiding officer or Mayor may direct.

SECTION XXII:

That the City Council may have the ability to have a discussion on any motion.

SECTION XXIII:

That Roberts' Rules of Order be and is hereby adopted as the rules of procedure for this Council in those situations which cannot be resolved by the rules set forth in this Ordinance.

SECTION XXIV:

The City Council will set all public hearings by a majority vote. At all public hearings after the initial presentation all questions and comments are limited to three (3) minutes per speaker.

SECTION XXV:

All motions that come from committees must still be seconded.

SECTION XXVI:

That Ordinance 2009-21 be and is hereby repealed in its entirety and that other ordinance(s), parts of ordinance(s) or resolutions(s) conflicting with the provisions of this Ordinance are hereby repealed insofar as they conflict.

SECTION XXVII:

That the provisions of this Ordinance are severable. If any provision, section, paragraph, sentence are part thereof shall be held to be unconstitutional or invalid by a court of competent jurisdiction, such decision shall not effect or impair the remainder of this Ordinance, it being the legislative intent to ordain and act each provision section, paragraph, sentence, and part thereof separately and independently of each other.

SECTION XXVIII:

This Ordinance shall take effect and be enforced from and after approval by the City Council of the City of Daphne upon publication required by law.

ADOPTED AND APPROVED BY THE MAYOR AND CITY COUNCIL OF THE CITY OF DAPHNE, ALABAMA on this the 5th day of NOvember, 2012.

CITY OF DAPHNE, AN ALABAMA MUNICIPAL CORPORATION

Bailey Yelding Jr

BAILEY YELDING, JR.,
MAYOR

ATTEST:

Rebecca A. Hayes

REBECCA A. HAYES,
INTERIM-CITY CLERK

UPDATE

ON

HIGHWAY 64

&

COUNTY ROAD 13

ROUNDABOUT

The City of Daphne and Baldwin County Commission

RECYCLE DAPHNE

Daphne

ALABAMA

The Jubilee City

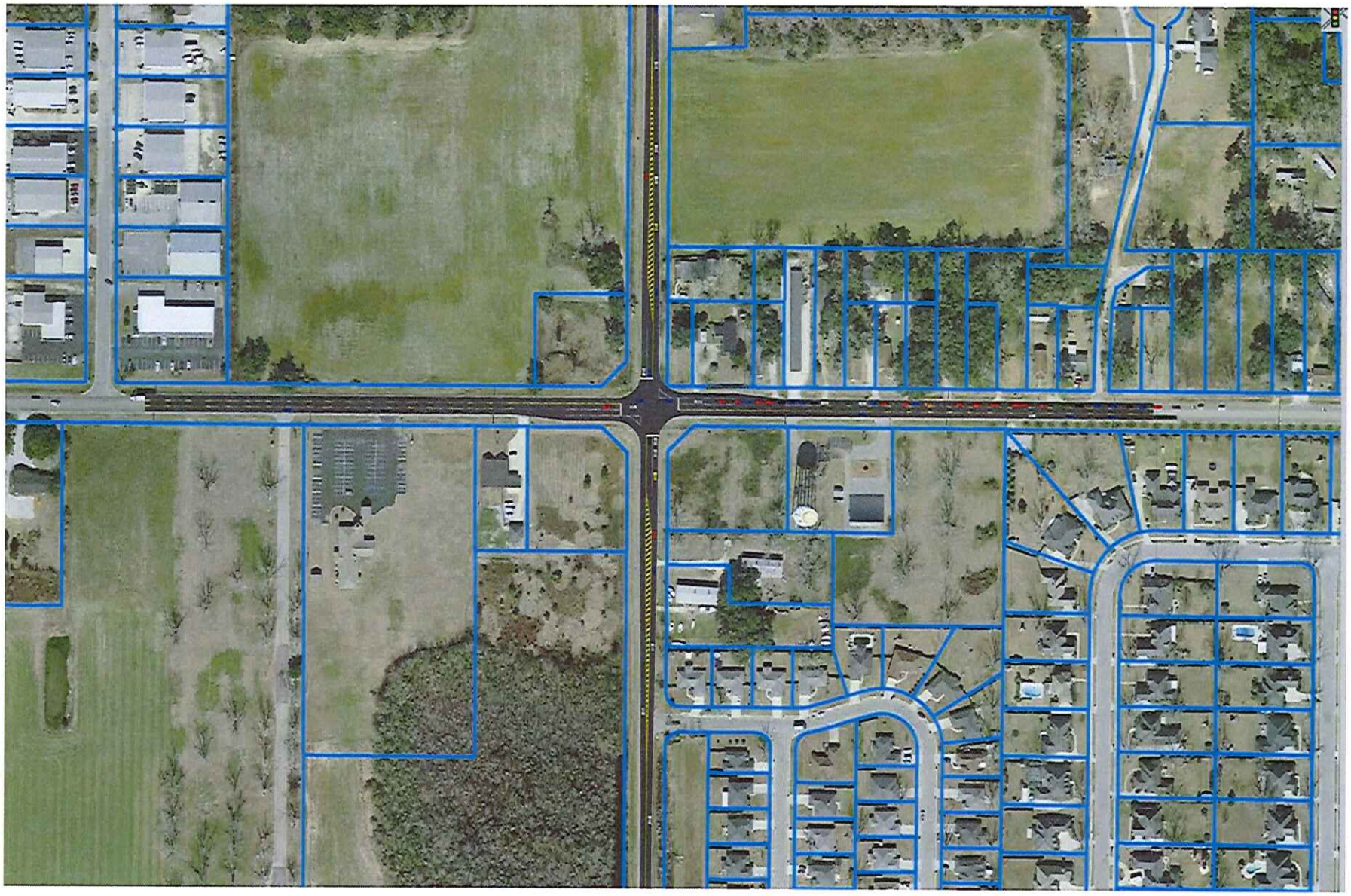
Intersection Improvements at County Roads 13 and 64

Second Round ATRIP

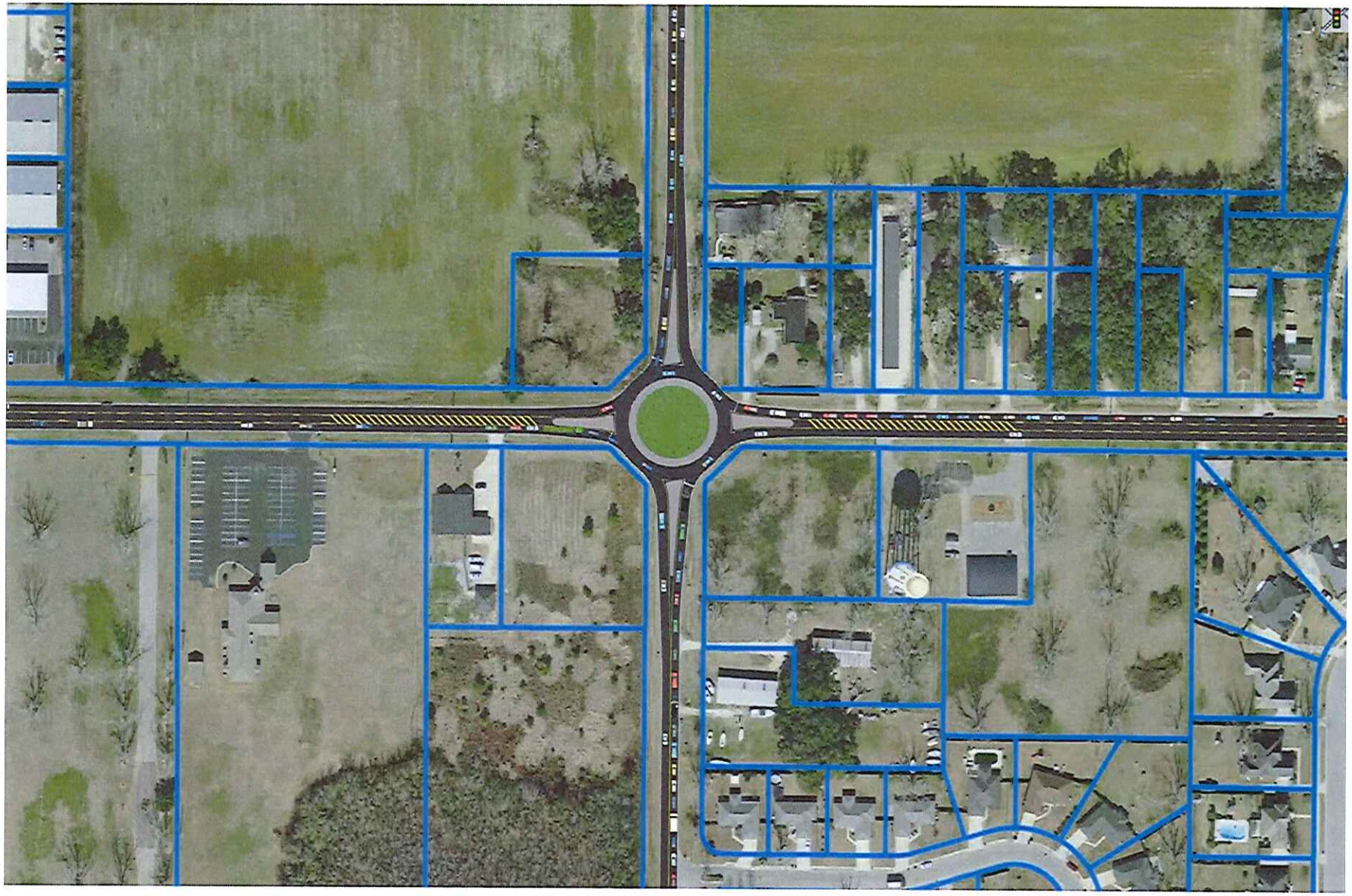
- Alabama Transportation Rehabilitation and Improvement Program (ATRIP).
- ATRIP is an ALDOT administered federal aid highway program that funds up to 80% of the construction of important roadway projects.
- The City of Daphne partnered with Baldwin County in the Fall of 2012 to apply for an ATRIP Grant for the improvement of the Intersection of County Roads 13 and 64.
- The North, South, and East Approaches are in the City and the West approach is in Baldwin County.
- The Grant was applied for with the intention of building a Round-A-Bout in lieu of a Signalized Intersection.

Existing Conditions at CR 13 & 64

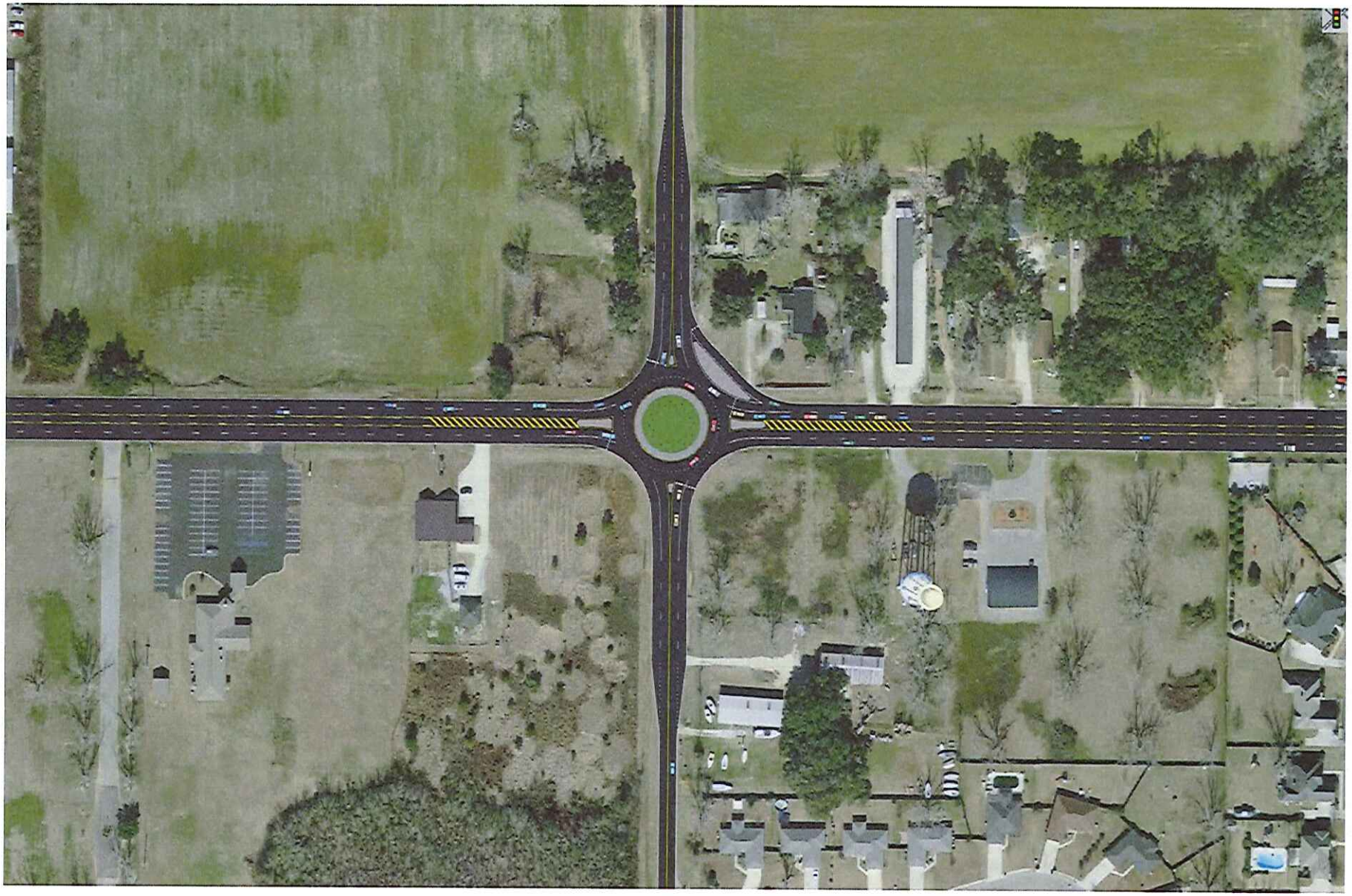
Intersection with Signalization



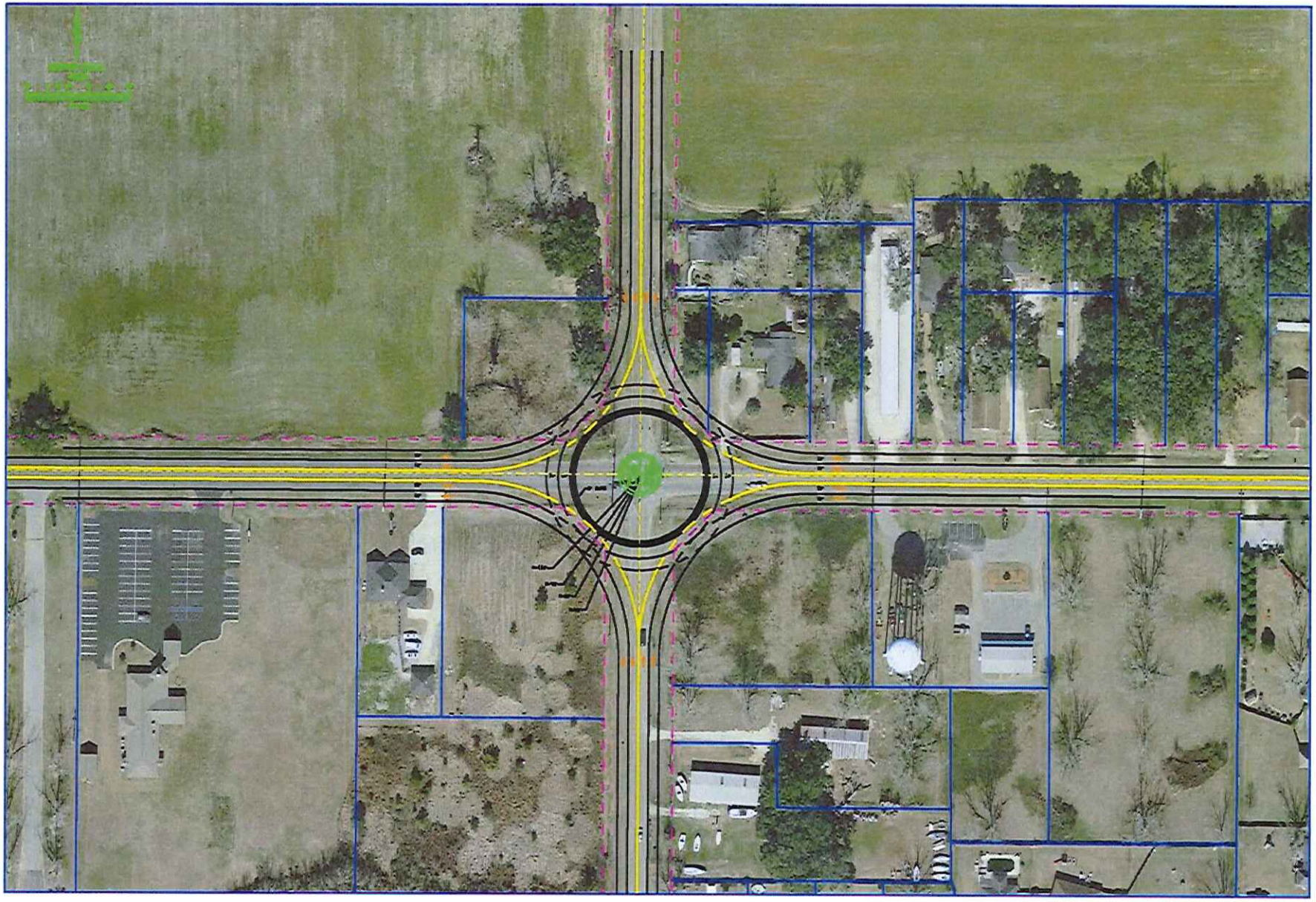
With a Single Lane Round-A-Bout



With a Two Lane Round-A-Bout



Conceptual Design



Preliminary Cost Estimates

- Survey, Engineering, and Design (Preble-Rish): $86,677.00
- R.O.W. Acquisition: $400,00.00
- Utility Relocation: $250,000.00
- Construction: $587,000.00
- Construction Engineering & Inspection: $88,000.00
- Project Total: $1,411,677.00

Preliminary Cost Sharing

Activity	Cost	City	County	Grant/ ALDOT
Survey, Engineering & Design	$86,677.00	$43,338.50	$43,338.50	$0.00
R.O.W. Acquisition	$400,000.00	$100,000.00	$100,000.00	$200,000.00
Utility Relocation	$250,000.00	$125,000.00	$125,000.00	$0.00
Construction	$587,000.00	$58,700.00	$58,700.00	$469,600.00
CE&I	$88,000.00	$8,800.00	$8,800.00	$70,400.00
Totals	$1,411,677.00	$335,838.50	$335,838.50	$740,000.00

Project Timeline & Action Items

- 13 Month Schedule – April 2014 Letting Date
- City must enter into a Intergovernmental Service Agreement with Baldwin County Commission – March 18th (1st Read); April 1st (2nd Read)
- Includes $43,338.50 appropriation for preliminary Survey, Engineering & Design

Questions?