



Sustainable Communities Calculator

Status Presentation

April 16, 2012

Sprinkle Consulting

Presentation Topics

- 1. History & Background**
- 2. Phase II Calculator Development**
- 3. Significant Factors Affecting Costs**
- 4. Tool (Computational Engine) Preview**
- 5. Preliminary Examples**
- 6. Status – Continued Development**



Regional Mobility Plan

RMP focuses on:

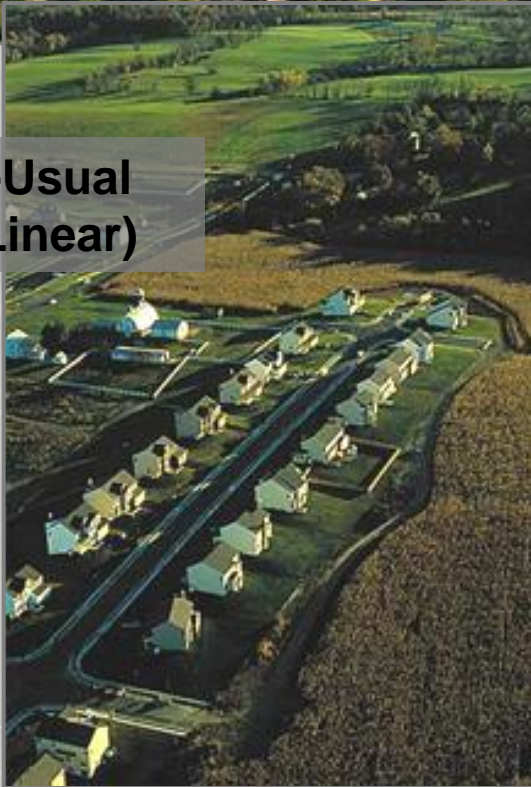
- **Moving people and goods, not autos**
- **“Complete Streets” designed to provide Access and Mobility to all users**
- **Interconnectivity and Local Network**
- **Identifying needs by “Corridors”**
- **Initiate looking beyond the 20 year horizon (50+ year horizon)**

RMP Development Scenarios

**“Quality Growth Plus”
(Compact / Infill)**



**Business-as-Usual
(Scattered / Linear)**




**Quality Growth
(Contiguous / USA fringe)**



Phase I Calculator's Role & Capability




Inform the selection of the preferred growth scenario through the calculation of associated costs to local governments



CRTPA Sustainable Communities Calculator v0.3



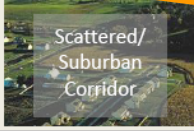

Capital Region Transportation Planning Agency
Tallahassee, FL MSA

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Planned Development & Surrounding Infrastructure Characteristics

Characteristics of Proposed Development & Surrounding Area
Metro Area Trips/mile

			
Generated Traffic's Avg. Trip Length (mi)...	5.4	8.8	11.2

Generated Traffic's Avg. Trip Length (mi)...

Proposed Number of Residential Dwelling Units..... 10,000

Planned Internal (Development) Connectivity..... input

LEED ND Certification
 Platinum Gold Silver Bronze None

Proposed Development's Land Use Mix:

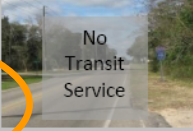
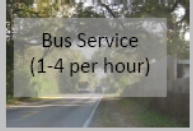
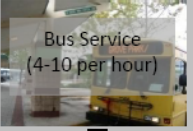

% Residential	100
% Office	0
% Retail	0
% Industrial	0
% Institutional	0

Resulting External Trip Generation Rate (daily/unit)..... 9.57 trip ends

Population Density of Surrounding (2-mile radius) Area..... input people/mi²

Average Household Income
 Within Planned Development..... input
 Within Surrounding Area..... input

"Livability" Infrastructure of Surrounding Area
Public Transit Service (select the quality of service provided to your development)

			
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Walking Infrastructure: Subarea Walking Conditions (via Pedestrian LOS) input

Bicycling Infrastructure: Subarea Bicycling Conditions (via Bicycle LOS) input

Americans with Disabilities Act (ADA) Infrastructure Compliance (% Network Coverage)..... input

Regional Roadway Network O&M Costs
(excluding costs for through facilities)

Cities	\$14,200,000
County	\$5,800,000
State	\$8,500,000
Total.....	\$28,500,000

Total Metro Area's Annual Vehicle Miles Traveled (excluding external VMT) 2,439,235,870

O&M Costs per VMT for Network \$0.0117

Active Transportation Planners+Engineers

Impacts on Traffic Activity

Form / Location

Avg. Traffic Trip Length

Duncan'89 FDOT (335.067, F.S.) Weighted Avg.

Business-as-Usual
(Scattered / Linear)

8.3 mi

12.1mi

11.2mi

Quality Growth
(Contiguous / USA fringe)

6.4mi

9.6mi

8.8mi

“Quality Growth Plus”
(Compact / Infill)

6.8mi

4.9mi

5.4mi

100 lot subdivision



Development Data	
Total Site Area:	73.6 Ac.
Retention Provided:	10.28 Ac. (14%)
20% Required Common Open Space:	14.72 Ac.
Common Open Space Provided:	22.15 Ac.
5% Required Usable Open Space:	3.68 Ac.
Usable Open Space Provided:	6.40 Ac.



○ 10' Single Family
 Total Units:
 Divided Entrance
 Typical 50' ROW.

Vehicle Miles Traveled (VMT)

Development Form/Location	Annual Trips	Trip Length	Annual VMT
Business-as-Usual (Scattered)	346,996	11.2	3,886,355
Quality Growth (Contiguous)	346,996	8.8	3,053,565
"Quality Growth Plus" (Compact/Infill)	346,996	5.4	1,873,778

Streets & Roadways Maintenance

Jurisdiction	Network Maintenance: Resurface, Repair, Replace, etc.
City	\$14,200,000
County	\$5,800,000
FDOT*	\$8,500,000
Total	\$28,500,000

\$0.0117/VMT

2,439,235,870 VMT*

* Excluding I-10 Costs and Traffic

Data Sources: City of Tallahassee Annual Budget, Leon County Annual Budget, Leon County CIP, FDOT Historical Work Program, and FDOT Countywide VMT Estimate

Costs of Development Location

Development Form/Location	Annual VMT	Network Maintenance per VMT	Annual Cost	35-yr Cost	Present Cost
Business as Usual (Scattered)	3,886,355	\$0.0117	\$45,408	\$1,589,284	\$975,693
Quality Growth (Contiguous)	3,053,565	\$0.0117	\$35,678	\$1,248,723	\$766,616
"Quality Growth Plus" (Compact/Infill)	1,873,778	\$0.0117	\$21,893	\$766,262	\$470,424

(P/A, 3%, 35)

Phase I Calculator's Output



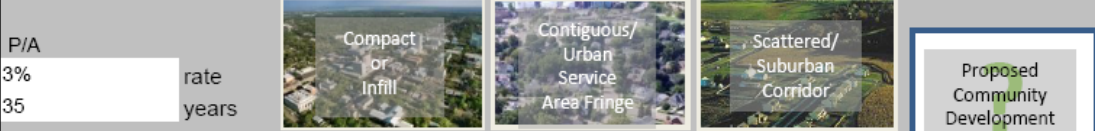
Sustainable Communities Calculator v0.3

Fiscal Impacts

Capital Region Transportation Planning Agency

Municipalities' & Taxpayers' Fiscal Impacts & Comparative Costs

O&M Costs by Development Type & Location



P/A
3% rate
35 years

	Compact or Infill	Contiguous/Urban Service Area Fringe	Scattered/Suburban Corridor	Proposed Community Development
<i>Impact to Affected Jurisdictions' Roadway Network Operating & Maintenance Costs</i>				
Annual	\$2,189,320	\$3,567,781	\$4,540,812	\$3,243,437
35-year Total	\$76,626,208	\$124,872,339	\$158,928,432	\$113,520,308
Present Costs	\$47,042,406	\$76,661,698	\$97,569,434	\$69,692,453
<i>Impact to Public Schools' Student Bus Transportation Costs</i>				
Annual	\$313,533	\$510,942	\$650,290	\$464,493
35-year Total	\$10,973,650	\$17,882,985	\$22,760,163	\$16,257,259
Present Costs	\$6,736,949	\$10,978,732	\$13,972,932	\$9,980,666
<i>Impact to Other Public Infrastructure and O&M Costs (e.g., Public Safety, Wastewater, Fire/Rescue, Water, Parks, Solid Waste)</i>				
Annual	\$1,970,388	\$3,211,003	\$4,086,731	\$2,919,094
35-year Total	\$68,963,587	\$112,385,105	\$143,035,588	\$102,168,277
Present Costs	\$42,338,165	\$68,995,528	\$87,812,491	\$62,723,208
Total O&M Costs (Roads, School Transportation, and Other Public Infrastructure)				
Annual	\$4,473,241	\$7,289,727	\$9,277,834	\$6,627,024
35-year Total	\$156,563,445	\$255,140,429	\$324,724,183	\$231,945,845
Present Costs	\$96,117,520	\$156,635,959	\$199,354,857	\$142,396,326



RMP Implementation Tools

- Build Quality School Communities in the Population Growth Nodes
- Focus Civic Activity and Services Investment into the Quality Growth Node
- Foster Aggregation of Parcels and Common Infrastructure
- Recruit Essential Private Sector Components of Life Long Communities
- Hyper-streamline (re-)Development Approvals in the Quality Growth Nodes
- **Employ Long-Term Benefit-Cost Assessment for Development Decisions**
- **Employ Simple, Clear Mobility Fee-type Approach**

Presentation Topics

1. History & Background
2. Phase II Calculator Development
3. Significant Factors Affecting Costs
4. Tool (Computational Engine) Preview
5. Preliminary Examples
6. Status – Continued Development

- **Location of Development**
- **Nature of Development**
- **Land Use Mix**
- **Internal Characteristics of Development**
- **Development's Integration of Public Transit**
- **Active Transportation Accommodation**

- **Enable Leadership to Guide Development into Nodal Focus Areas**
- **Plan Transportation System**
- **Evaluate Development Requests**
- **Shape the Character of Growth**

The Sustainable Communities Calculator:

“Bringing reliable studies, methods, and equations to your fingertips...”

Travel and the Built Environment

A Meta-Analysis

Reid Ewing and Robert Cervero

Problem: Locations and sites are moving to land planning and urban design for help in reducing automobile use and related social and environmental costs. The effects of such strategies on travel demand have not been generalized in recent years from the multitude of available studies.

Purpose: We conducted a meta-analysis of the built environment-travel literature existing at the end of 2009 in order to draw generalizable conclusions for practice. We aimed to quantify effect sizes, update earlier work, include additional outcome measures, and address the methodological issues of self-selection.

Methods: We compared elasticities for individual studies and pooled them to produce weighted averages.

Results and conclusions: Travel variables are generally inelastic with respect to change in measures of the built environment. Of the environmental variables considered here, none has a weighted average travel elasticity of absolute magnitude greater than 0.30, and most are much less. Still, the combined effect of several such variables on travel could be quite large.

Consistent with prior work, we find that:

- vehicle miles traveled (VMT) is most strongly related to measures of accessibility to destinations and accessibility to street network design variables. Walking is most strongly related to measures of land use diversity, intersection density, and the number of destinations within walking

Some of today's most vexing problems, including sprawl, congestion, oil dependence, and climate change, are prompting states and localities to turn to land planning and urban design to rein in automobile use. Many have concluded that roads cannot be built fast enough to keep up with rising travel demand induced by the road building itself and the sprawl it spawns.

The purpose of this meta-analysis is to summarize empirical results on associations between the built environment and travel, especially nonwork

Keywords: vehicle miles traveled (VMT), walking, transit, built environment, effect sizes.



Research support: U.S. Environmental Protection Agency.

About the authors: Reid Ewing (reid@uh.edu) is professor of city and metropolitan planning at the University of Utah, associate editor of the *Journal of the American Planning Association*, columnist for *Planning magazine*, and fellow of the Urban Land Institute. Robert Cervero (rcerv@ohio.edu) is professor of city and regional planning at University of California, Berkeley, director of the University of California Transportation Center, and interim director of the Institute of Urban and Regional Development.

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DOI: 10.1177/0895402210387262
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CONSERVE BY BICYCLING AND WALKING

PHASE II REPORT

Presentation Topics

1. History & Background
2. Phase II Calculator Development
- 3. Significant Factors Affecting Costs**
4. Tool (Computational Engine) Preview
5. Preliminary Examples
6. Status – Continued Development

Factors Affecting Costs

- **Destination or Location (proximity to jobs)**
- **Design (street network characteristics)**
- **Diversity (land use mix)**
- **Density or “Compactness” (of residential)**
- **Distance to (or Integration of) Public Transit**

Source: Ewing and Cervero, 2010 (Federal Highway Administration
metastudy)

Presentation Topics

1. History & Background
2. Phase II Calculator Development
3. Significant Factors Affecting Costs
4. Tool (Computational Engine) Preview
5. Preliminary Examples
6. Status – Continued Development


Tool (Computational Engine) Preview (example inputs and outputs)

Factors Affecting Costs

- **Destination or Location (proximity to jobs)**
- **Design (street network characteristics)**
- **Diversity (land use mix)**
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Development Setting & Pattern




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Tallahassee, FL MSA


Planned Development & Surrounding Infrastructure Ch

Characteristics of Proposed Development & Surrounding Area

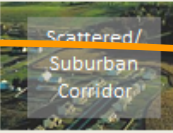
Metro Area Typicals




Heavy CBD



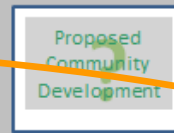
District



Scattered/
Suburban
Corridor



Rural



Proposed
Community
Development

Existing Development Setting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Proposed Development Pattern	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Generated Traffic Avg. Trip Length	3.6	4.2	5.9	7.3	7.7
Proposed Number of Residential Dwelling Units.....					4,770
Development Area (acres)					1920
VMT per Household per Year (from CNT website)					26,671
Proposed Development Location					Leon County
Proposed Development's Land Use Mix (Area):					
% Residential Area a					80
% Office Area					10
% Retail Area					5
% Industrial Area					5
% Institutional Area					0
Population Density of Surrounding (2-mile radius) Area.....					reserved

Factors Affecting Costs

- Destination or Location (proximity to jobs)
- **Design (street network characteristics)**
- Diversity (land use mix)
- Density or “Compactness” (of residential)
- Distance to (or Integration of) Public Transit

Source: Ewing and Cervero, 2010 (Federal Highway Administration
metastudy)

Internal Characteristics & Design

calculator v0.3

Agency

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Characteristics

"Livability" Infrastructure of Surrounding Area

Public Transit Service (select the quality of service provided to your development)

No Transit Service	Bus Service (1-4 per hour)	Bus Service (4-10 per hour)	BRT Service or Light Rail
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Reserved

Street Density (mi/mi)	Use Default	<input type="checkbox"/>	Specify	10
Ped Infrastructure: Sidewalk Coverage, %		<input type="checkbox"/>		100
Bike Infrastructure: Facility Coverage	Use Default	<input type="checkbox"/>		20
Average Distance to Transit (mi)	Use Default	<input type="checkbox"/>	Specify	0.25

Infrastructure Compliance (% Network Coverage)..... reserved

Regional Roadway Network Americans with Disabilities Act (ADA)
(excluding costs for through facilities)

Cities	\$14,200,000
County	\$5,800,000
State	\$8,500,000
Total.....	\$28,500,000

Total Metro Area's Annual Vehicle Miles Traveled
(excluding external VMT) 2,450,198,280

O&M Costs per VMT for Network \$0.0116

VMT of Base Condition	127,220,670
VMT of Proposed Development	84,485,379
% Change	-34%



Factors Affecting Costs

- Destination or Location (proximity to jobs)
- Design (street network characteristics)
- **Diversity (land use mix)**
- Density or “Compactness” (of residential)
- Distance to (or Integration of) Public Transit

Source: Ewing and Cervero, 2010 (Federal Highway Administration metastudy)

Land Use Mix



CRTPA Sustainable Communities Ca Capital Region Transportation Planning A Tallahassee, FL MSA

Planned Development & Surrounding Infrastructure Ch

Characteristics of Proposed Development & Surrounding Area

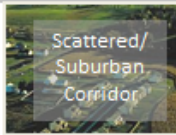
Metro Area Typical



Heavy CBD



Multi Modal District



Scattered/
Suburban
Corridor



Rural



Proposed
Community
Development

Existing Development Setting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
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Population Density of Surrounding (2-mile radius) Area..... reserved



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- Destination or Location (proximity to jobs)
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- Diversity (land use mix)
- **Density or “Compactness” (of residential)**
- Distance to (or Integration of) Public Transit

Source: Ewing and Cervero, 2010 (Federal Highway Administration metastudy)

Residential Density (units per area)

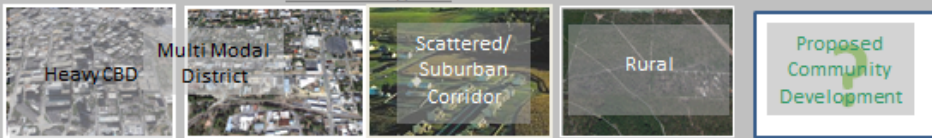


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 Capital Region Transportation Planning A
 Tallahassee, FL MSA

Planned Development & Surrounding Infrastructure Ch

Characteristics of Proposed Development & Surrounding Area

Metro Area Typicals



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Factors Affecting Costs

- Destination or Location (proximity to jobs)
- Design (street network characteristics)
- Diversity (land use mix)
- Density or “Compactness” (of residential)
- **Distance to (or Integration of) Public Transit**

Source: Ewing and Cervero, 2010 (Federal Highway Administration metastudy)

Distance to (Integration of) Transit

calculator v0.3
Agency

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Characteristics

"Livability" Infrastructure of Surrounding Area
Public Transit Service (select the quality of service provided to your development)

No
Transit
Service

Bus Service
(1-4 per hour)

Bus Service
(4-10 per hour)

BRT Service
or Light Rail

Reserved

Street Density (mi/mi)	Use Default	<input type="checkbox"/>	Specify	10
Ped Infrastructure: Sidewalk Coverage, %		<input type="checkbox"/>		100
Bike Infrastructure: Facility Coverage	Use Default	<input type="checkbox"/>		20
Average Distance to Transit (mi)	Use Default	<input type="checkbox"/>	Specify	0.25

Infrastructure Compliance (% Network Coverage)..... reserved

Regional Roadway Network Americans with Disabilities Act (ADA)
(excluding costs for through facilities)

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% Change	-34%

Calculator Output Tabs

39	Population Density of Surrounding (2-mile radius) Area.....
40	
49	
50	



Inputs (Scenario)

Outputs (Results)

Outputs - Fiscal Impacts Tab



Sustainable Communities Calculator v0.3

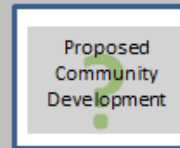
Fiscal Impacts

Capital Region Transportation Planning Agency

Municipalities' & Taxpayers' Fiscal Impacts & Comparative Costs

O&M Costs by Development Type & Location

P/A
3% rate
35 years



Impact to Affected Jurisdictions' Roadway Network Operating & Maintenance Costs

Annual	\$699,387	805,402	1,138,496	1,407,074	982,710
35-year Total	\$24,478,548	28,189,062	39,847,357	49,247,584	34,394,835
Present Costs	\$15,027,884	17,305,845	24,463,112	30,234,105	21,115,697

Impact to Public Schools' Student Bus Transportation Costs

Annual	\$100,609	115,860	163,777	202,413	212,291
35 year Total	\$3,521,331	4,055,102	5,732,192	7,084,450	7,430,176
Present Costs	\$2,161,818	2,489,511	3,519,111	4,349,290	4,561,538

Impact to Other Public Infrastructure and O&M Costs

(e.g., Public Safety, Wastewater, Fire/Rescue, Water, Trash, Solid Waste)

Annual	\$66,895,164	\$66,895,164	\$66,895,164	\$66,895,164	69,086,095
35 year Total	\$2,341,330,740	2,341,330,740	2,341,330,740	2,341,330,740	2,418,013,331
Present Costs	\$1,437,391,111	1,437,391,111	1,437,391,111	1,437,391,111	1,484,468,131

Total O&M Costs (Roads, School Transportation, and Other Public Infrastructure)

Annual	\$67,695,161	67,816,426	68,197,437	68,504,651	70,281,095
35 year Total	\$2,369,330,619	2,373,574,904	2,386,910,289	2,397,662,774	2,459,838,341
Present Costs	\$1,454,580,812	\$1,457,186,466	\$1,465,373,334	\$1,471,974,505	\$1,510,145,365

Outputs - Regional Economy Tab

Sustainable Communities Calculator v0.3

Regional Economy

Capital Region Transportation Planning Agency

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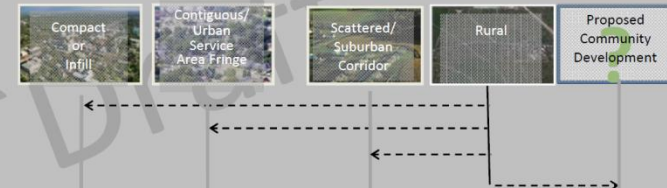


Effects on the Regional Economy

Comparative Costs



Comparative Benefits



Lost Disposable Income Commute Time Costs¹

	Compact or Infill	Contiguous/Urban Service Area Fringe	Scattered/Suburban Corridor	Rural	Proposed Community Development
Annual	\$866,115	\$3,587,416	\$5,781,635	\$5,781,635	\$3,235,907
10-Year Total	\$8,661,151	\$35,874,161	\$57,816,345	\$57,816,345	\$32,359,072

Gained Disposable Income Commute Time Costs

	Compact or Infill	Contiguous/Urban Service Area Fringe	Scattered/Suburban Corridor	Rural	Proposed Community Development
Annual	\$5,781,635	\$4,915,519	\$2,194,218	\$2,194,218	\$2,545,727
10-Year Total	\$57,816,345	\$49,155,194	\$21,942,184	\$21,942,184	\$25,457,274

Auto Ownership Costs²

	Compact or Infill	Contiguous/Urban Service Area Fringe	Scattered/Suburban Corridor	Rural	Proposed Community Development
Annual	\$2,522,775	\$10,449,239	\$16,840,444	\$16,840,444	\$15,185,605
10-Year Total	\$25,227,749	\$104,492,390	\$168,404,444	\$168,404,444	\$151,856,048

Auto Ownership Costs

	Compact or Infill	Contiguous/Urban Service Area Fringe	Scattered/Suburban Corridor	Rural	Proposed Community Development
Annual	\$16,840,444	\$14,317,669	\$6,391,205	\$6,391,205	\$1,654,840
10-Year Total	\$168,404,444	\$143,176,695	\$63,912,054	\$63,912,054	\$16,548,396

Auto Operations & Maintenance Costs³

	Compact or Infill	Contiguous/Urban Service Area Fringe	Scattered/Suburban Corridor	Rural	Proposed Community Development
Annual	\$1,748,533	\$7,242,357	\$11,672,096	\$11,672,096	\$10,525,128
10-Year Total	\$17,485,329	\$72,423,575	\$116,720,958	\$116,720,958	\$105,251,280

Auto Operations & Maintenance Costs

	Compact or Infill	Contiguous/Urban Service Area Fringe	Scattered/Suburban Corridor	Rural	Proposed Community Development
Annual	\$11,672,096	\$9,923,563	\$4,429,738	\$4,429,738	\$1,146,968
10-Year Total	\$116,720,958	\$99,235,629	\$44,297,383	\$44,297,383	\$11,469,677

Health Care Costs

	Compact or Infill	Contiguous/Urban Service Area Fringe	Scattered/Suburban Corridor	Rural	Proposed Community Development
Annual	\$751,005	\$3,207,878	\$4,339,587	\$4,339,587	\$171,521
10-Year Total	\$7,510,046	\$32,078,783	\$43,395,867	\$43,395,867	\$1,715,214

Health Care Costs

	Compact or Infill	Contiguous/Urban Service Area Fringe	Scattered/Suburban Corridor	Rural	Proposed Community Development
Annual	\$4,339,587	\$3,588,582	\$1,131,708	\$1,131,708	\$4,168,065
10-Year Total	\$43,395,867	\$35,885,821	\$11,317,084	\$11,317,084	\$41,680,653

Total

	Compact or Infill	Contiguous/Urban Service Area Fringe	Scattered/Suburban Corridor	Rural	Proposed Community Development
Annual	\$5,888,428	\$24,486,891	\$38,633,761	\$38,633,761	\$29,118,161
10-Year Total	\$58,884,275	\$244,868,908	\$386,337,614	\$386,337,614	\$291,181,613

Regional Spending Multiplier (RIMS II - Modified)⁵

	Compact or Infill	Contiguous/Urban Service Area Fringe	Scattered/Suburban Corridor	Rural	Proposed Community Development
Annual	\$57,216,601	\$48,495,839	\$20,951,515	\$20,951,515	\$14,092,604
10-Year Total	\$572,166,006	\$484,958,395	\$209,515,153	\$209,515,153	\$140,926,036



Outputs - Regional Economy (Health)



Sustainable Communities Calculator v0.3

Regional Economy

Capital Region Transportation Planning Agency

1-888-462-3514
www.sprinkleconsulting.com

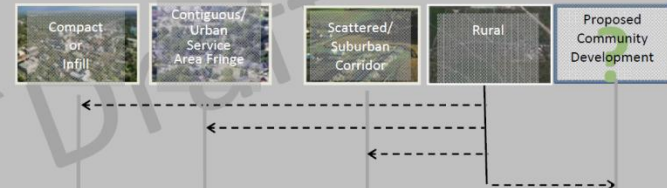


Effects on the Regional Economy

Comparative Costs



Comparative Benefits



Lost Disposable Income

	Compact for Infill	Contiguous/Urban Service Area Fringe	Scattered/Suburban Corridor	Rural	Proposed Community Development
Commute Time Costs¹					
Annual	\$866,115	\$3,587,416	\$5,781,635	\$3,235,907	\$3,235,907
10-Year Total	\$8,661,151	\$35,874,161	\$57,816,345	\$32,359,072	\$32,359,072
Auto Ownership Costs²					
Annual	\$2,522,775	\$10,449,239	\$16,840,444	\$15,185,605	\$15,185,605
10-Year Total	\$25,227,749	\$104,492,390	\$168,404,444	\$151,856,048	\$151,856,048
Auto Operations & Maintenance Costs³					
Annual	\$1,748,533	\$7,242,357	\$11,672,096	\$10,525,128	\$10,525,128
10-Year Total	\$17,485,333	\$72,423,575	\$116,720,958	\$105,251,280	\$105,251,280
Health Care Costs					
Annual	\$751,005	\$3,207,878	\$4,339,587	\$171,521	\$171,521
10-Year Total	\$7,510,046	\$32,078,783	\$43,395,867	\$1,715,214	\$1,715,214
Total					
Annual	\$5,888,428	\$24,488,801	\$38,633,761	\$29,118,161	\$29,118,161
10-Year Total	\$58,884,275	\$244,868,908	\$386,337,614	\$291,181,613	\$291,181,613

Gained Disposable Income

	Compact for Infill	Contiguous/Urban Service Area Fringe	Scattered/Suburban Corridor	Rural	Proposed Community Development
Commute Time Costs					
Annual	\$5,781,635	\$4,915,519	\$2,194,218	\$2,545,727	\$2,545,727
10-Year Total	\$57,816,345	\$49,155,194	\$21,942,184	\$25,457,274	\$25,457,274
Auto Ownership Costs					
Annual	\$16,840,444	\$14,317,669	\$6,391,205	\$1,654,840	\$1,654,840
10-Year Total	\$168,404,444	\$143,176,695	\$63,912,054	\$16,548,396	\$16,548,396
Auto Operations & Maintenance Costs					
Annual	\$11,672,096	\$9,923,563	\$4,429,738	\$1,146,968	\$1,146,968
10-Year Total	\$116,720,958	\$99,235,629	\$44,297,383	\$11,469,677	\$11,469,677
Health Care Costs					
Annual	\$4,339,587	\$3,588,582	\$1,131,708	\$4,168,065	\$4,168,065
10-Year Total	\$43,395,867	\$35,885,821	\$11,317,084	\$41,680,655	\$41,680,655
Regional Spending Multiplier (RIMS II - Modified)⁵					
Annual	\$57,216,601	\$48,495,839	\$20,951,515	\$14,092,604	\$14,092,604
10-Year Total	\$572,166,006	\$484,958,395	\$209,515,153	\$140,926,036	\$140,926,036



Outputs - Energy & Environment Tab



Sustainable Communities Calculators Energy & Environment

Capital Region Transportation Planning Agency

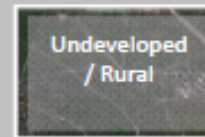
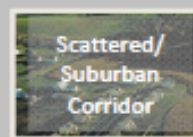


Community-Wide Energy & Environmental Impacts & Costs

Average Auto Fuel Cost
Average Auto Fuel Efficiency
Base Annual VMT/Household

\$3.85 /gallon
20.7 mpg
19,798 miles

per <http://htaindex.cnt.org/map/>



**Proposed
Community
Development**

Fuel Consumed (gallons)
Annual
35-Year Total

2,904,716	3,345,019	4,728,436	5,843,902	3,029,565
101,665,048	117,075,668	165,495,256	204,536,565	106,034,768

Fuel Consumption Costs
Annual
35-Year Total

\$11,183,155	\$12,878,323	\$18,204,478	\$22,499,022	\$11,663,825
\$391,410,436	\$450,741,321	\$637,156,735	\$787,465,774	\$408,233,858

Emissions Impact (lbs/year)

VOC ¹	106,047	122,122	172,628	213,352	110,605
NOx ²	89,477	103,040	145,655	180,016	93,323
Particulates ³	10,605	12,212	17,263	21,335	11,061
Greenhouse (CO ₂) ³	55,939,771	64,419,249	91,061,450	112,543,384	58,344,148

Presentation Topics

- 1. History & Background**
- 2. Phase II Calculator Development**
- 3. Significant Factors Affecting Costs**
- 4. Tool (Computational Engine) Preview**
- 5. Preliminary Examples**
- 6. Status – Continued Development**




Preliminary Example Calculations

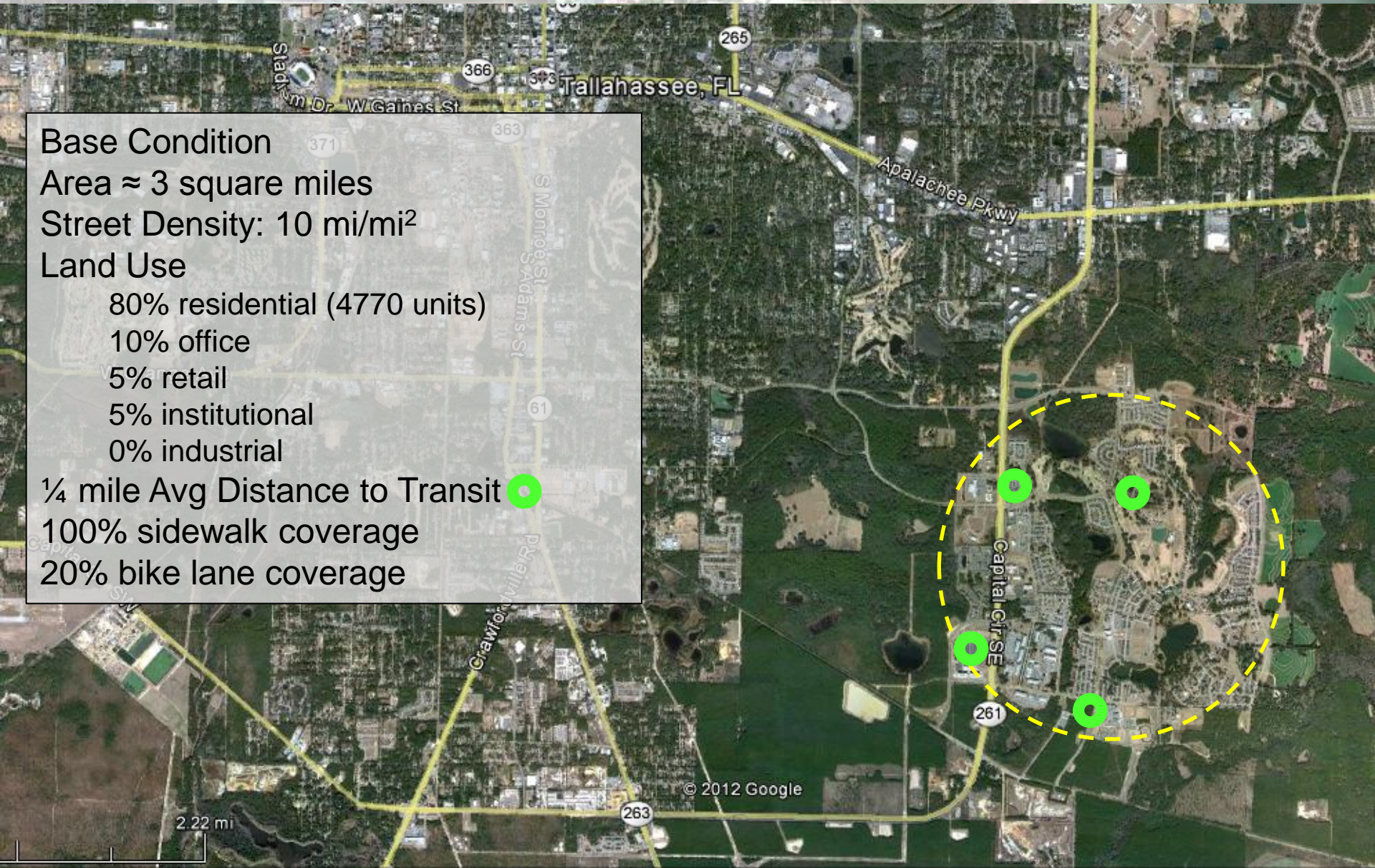
Southwood – As Is

Base Condition
Area \approx 3 square miles
Street Density: 10 mi/mi²

Land Use

- 80% residential (4770 units)
- 10% office
- 5% retail
- 5% institutional
- 0% industrial

$\frac{1}{4}$ mile Avg Distance to Transit 
100% sidewalk coverage
20% bike lane coverage



Southwood – As Is (Outputs)



Sustainable Communities Calculator v0.3

Fiscal Impacts

Capital Region Transportation Planning Agency

Municipalities' & Taxpayers' Fiscal Impacts & Comparative Costs

O&M Costs by Development Type & Location

PIA
3% rate
35 years

Proposed
Community
Development

Impact to Affected Jurisdictions' Roadway Network Operating & Maintenance Costs

Annual	\$699,387	805,402	1,138,496	1,407,074	982,710
35-year Total	\$24,478,548	28,189,062	39,847,357	49,247,584	34,394,835
Present Costs	\$15,027,884	17,305,845	24,463,112	30,234,105	21,115,697

Impact to Public Schools' Student Bus Transportation Costs

Annual	\$100,609	115,860	163,777	202,413	212,291
35 year Total	\$3,521,331	4,055,102	5,732,192	7,084,450	7,430,176
Present Costs	\$2,161,818	2,489,511	3,519,111	4,349,290	4,561,538

Impact to Other Public Infrastructure and O&M Costs

(e.g., Public Safety, Wastewater, Fire/Rescue, Water, Trash, Solid Waste)

Annual	\$66,895,164	\$66,895,164	\$66,895,164	\$66,895,164	69,086,095
35 year Total	\$2,341,330,740	2,341,330,740	2,341,330,740	2,341,330,740	2,418,013,331
Present Costs	\$1,437,391,111	1,437,391,111	1,437,391,111	1,437,391,111	1,484,468,131

Total O&M Costs (Roads, School Transportation, and Other Public Infrastructure)

Annual	\$67,695,161	67,816,426	68,197,437	68,504,651	70,281,095
35 year Total	\$2,369,330,619	2,373,574,904	2,386,910,289	2,397,662,774	2,459,838,341
Present Costs	\$1,454,580,812	\$1,457,186,466	\$1,465,373,334	\$1,471,974,505	\$1,510,145,365

Southwood – Varied Mix

Base Condition

Area \approx 3 square miles

Street Density: 10 mi/mi²

Land Use

70% residential (4770 units)

15% office

10% retail

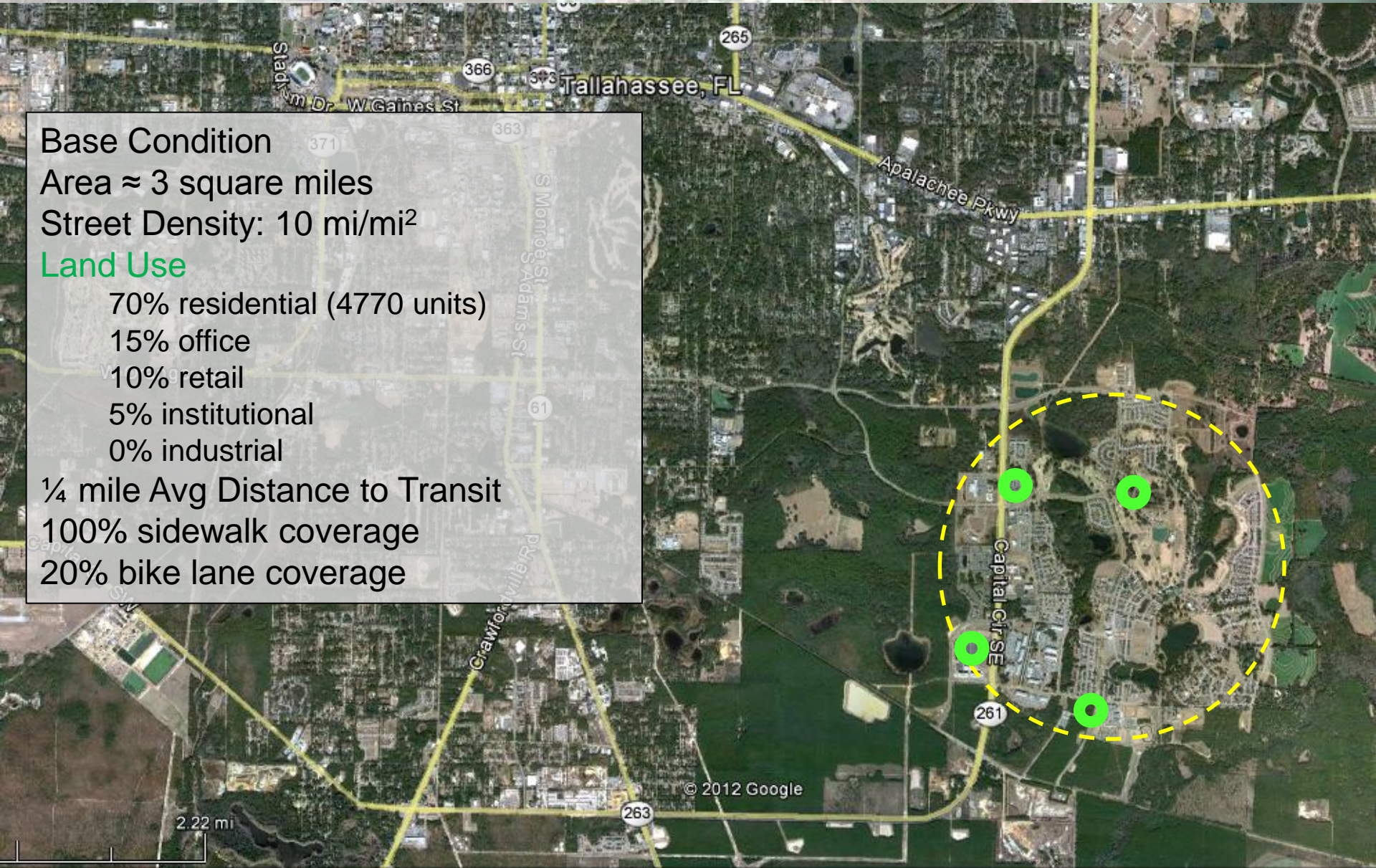
5% institutional

0% industrial

$\frac{1}{4}$ mile Avg Distance to Transit

100% sidewalk coverage

20% bike lane coverage



Southwood – Varied Mix (Outputs)



Sustainable Communities Calculator v0.3

Fiscal Impacts

Capital Region Transportation Planning Agency

Municipalities' & Taxpayers' Fiscal Impacts & Comparative Costs

O&M Costs by Development Type & Location

PIA
3% rate
35 years

Proposed
Community
Development

Impact to Affected Jurisdictions' Roadway Network Operating & Maintenance Costs

Annual	\$699,387	805,402	1,138,496	1,407,074	941,472
35-year Total	\$24,478,548	28,189,062	39,847,357	49,247,584	32,951,533
Present Costs	\$15,027,884	17,305,845	24,463,112	30,234,105	20,229,624

Impact to Public Schools' Student Bus Transportation Costs

Annual	\$100,609	115,860	163,777	202,413	212,291
35 year Total	\$3,521,331	4,055,102	5,732,192	7,084,450	7,430,176
Present Costs	\$2,161,818	2,489,511	3,519,111	4,349,290	4,561,538

Impact to Other Public Infrastructure and O&M Costs

(e.g., Public Safety, Wastewater, Fire/Rescue, Water, Trash, Solid Waste)

Annual	\$66,895,164	\$66,895,164	\$66,895,164	\$66,895,164	69,086,095
35 year Total	\$2,341,330,740	2,341,330,740	2,341,330,740	2,341,330,740	2,418,013,331
Present Costs	\$1,437,391,111	1,437,391,111	1,437,391,111	1,437,391,111	1,484,468,131

Total O&M Costs (Roads, School Transportation, and Other Public Infrastructure)

Annual	\$67,695,161	67,816,426	68,197,437	68,504,651	70,239,858
35 year Total	\$2,369,330,619	2,373,574,904	2,386,910,289	2,397,662,774	2,458,395,039
Present Costs	\$1,454,580,812	\$1,457,186,466	\$1,465,373,334	\$1,471,974,505	\$1,509,259,292

Southwood – Varied Street Density

Base Condition

Area \approx 3 square miles

Street Density: 15 mi/mi²

Land Use

- 80% residential (4770 units)

- 10% office

- 5% retail

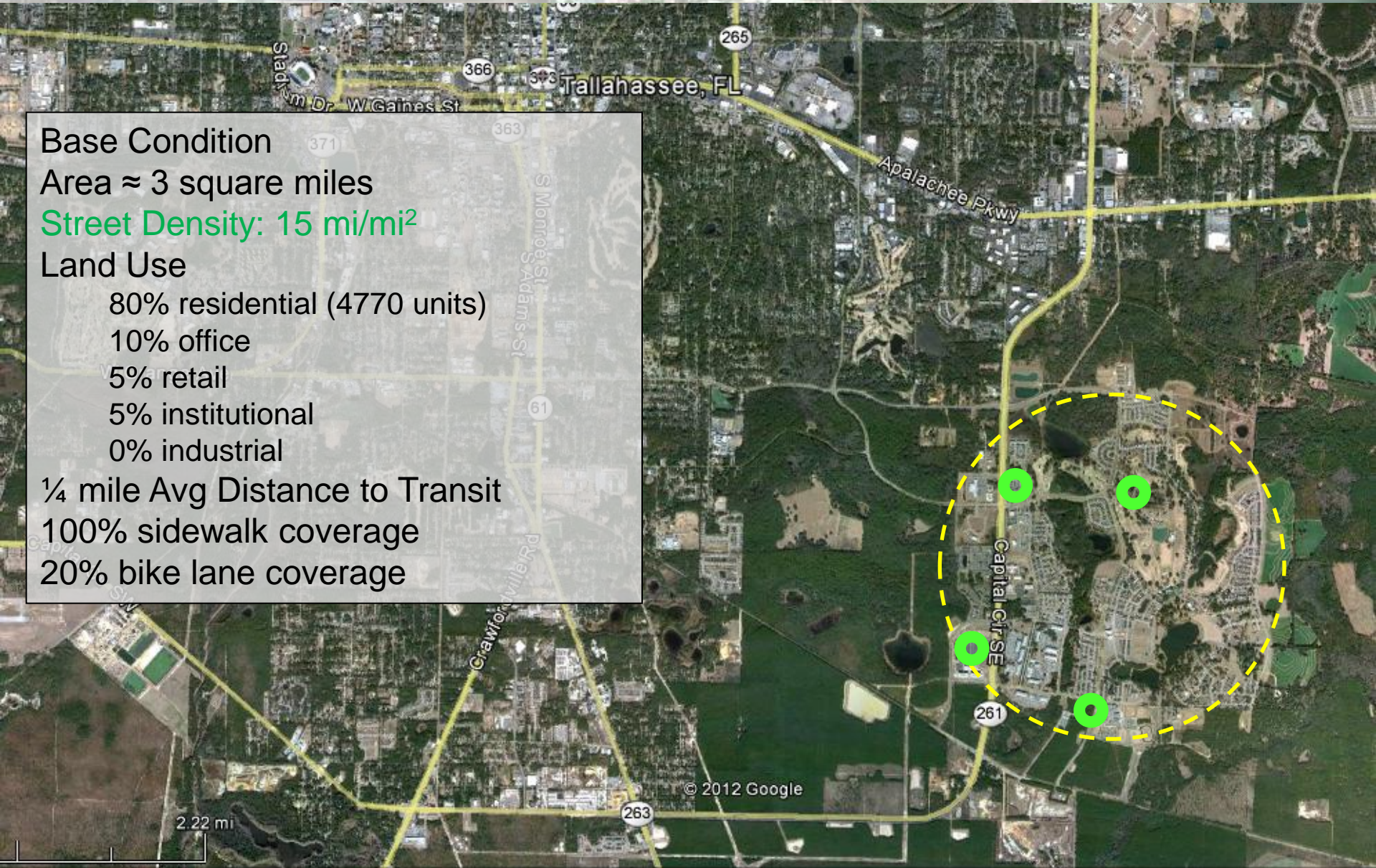
- 5% institutional

- 0% industrial

$\frac{1}{4}$ mile Avg Distance to Transit

100% sidewalk coverage

20% bike lane coverage



Southwood – Varied Street Density (Outputs)



Sustainable Communities Calculator v0.3

Fiscal Impacts

Capital Region Transportation Planning Agency

Municipalities' & Taxpayers' Fiscal Impacts & Comparative Costs

O&M Costs by Development Type & Location

PIA
3% rate
35 years

Proposed
Community
Development

Impact to Affected Jurisdictions' Roadway Network Operating & Maintenance Costs

Annual	\$699,387	805,402	1,138,496	1,407,074	820,428
35-year Total	\$24,478,548	28,189,062	39,847,357	49,247,584	28,714,994
Present Costs	\$15,027,884	17,305,845	24,463,112	30,234,105	17,628,726

Impact to Public Schools' Student Bus Transportation Costs

Annual	\$100,609	115,860	163,777	202,413	212,291
35 year Total	\$3,521,331	4,055,102	5,732,192	7,084,450	7,430,176
Present Costs	\$2,161,818	2,489,511	3,519,111	4,349,290	4,561,538

Impact to Other Public Infrastructure and O&M Costs

(e.g., Public Safety, Wastewater, Fire/Rescue, Water, Trash, Solid Waste)

Annual	\$66,895,164	\$66,895,164	\$66,895,164	\$66,895,164	69,086,095
35 year Total	\$2,341,330,740	2,341,330,740	2,341,330,740	2,341,330,740	2,418,013,331
Present Costs	\$1,437,391,111	1,437,391,111	1,437,391,111	1,437,391,111	1,484,468,131

Total O&M Costs (Roads, School Transportation, and Other Public Infrastructure)

Annual	\$67,695,161	67,816,426	68,197,437	68,504,651	70,118,814
35 year Total	\$2,369,330,619	2,373,574,904	2,386,910,289	2,397,662,774	2,454,158,501
Present Costs	\$1,454,580,812	\$1,457,186,466	\$1,465,373,334	\$1,471,974,505	\$1,506,658,394



A 100 Unit Development Example

Example Development Pattern

100 Residential Units

Area \approx 40 Acres

Land Use

80% residential (1500 units)

10% office

5% retail

5% institutional

0% industrial

10 miles/square mile street density

1/4 mile Avg Distance to Transit

100% sidewalk coverage

20% bike lane coverage

Rural Setting

VMT 1,771,182

35 yr transportation impact \$721,100

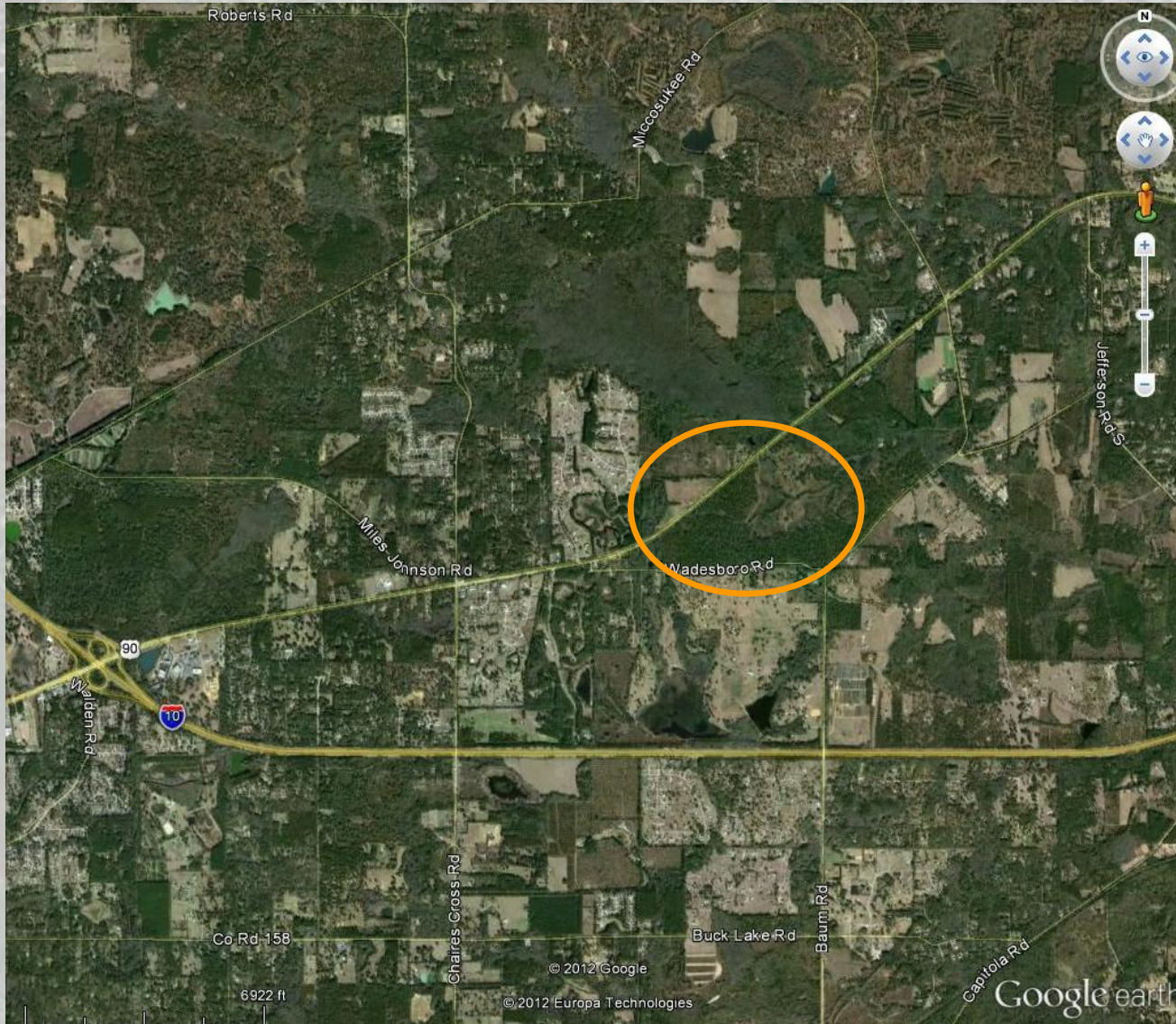
MMTD Setting

VMT 966,526

35 yr transportation impact \$393,500

45% reduction in impacts

Rockaway Development



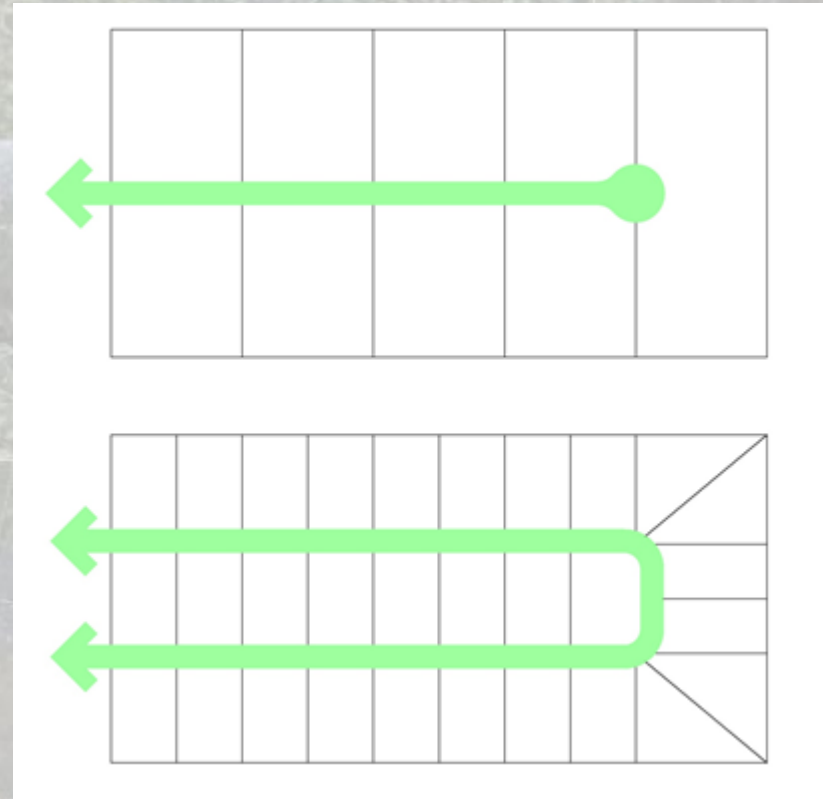
Rockaway Development Example

Two proposed residential densities, which has an effect on street density:

1. One unit per ten acres
31,353 annual vmt/hh
\$12,764 35 yr cost/hh
(transportation costs)

2. One unit per three acres
27,589 annual vmt/hh
\$11,232 35 yr cost/hh

12% reduction



Presentation Topics

1. History & Background
2. Phase II Calculator Development
3. Significant Factors Affecting Costs
4. Tool (Computational Engine) Preview
5. Preliminary Examples
6. Status – Continued Development

Upcoming Activities:

- Refinement of Future Year Trip Length Data
- Development of Housing & Transportation Costs
- Transit Provision Characteristics & Impacts
- Development of Web-Based Interface
- Jurisdictional Training

Questions & Answers Session

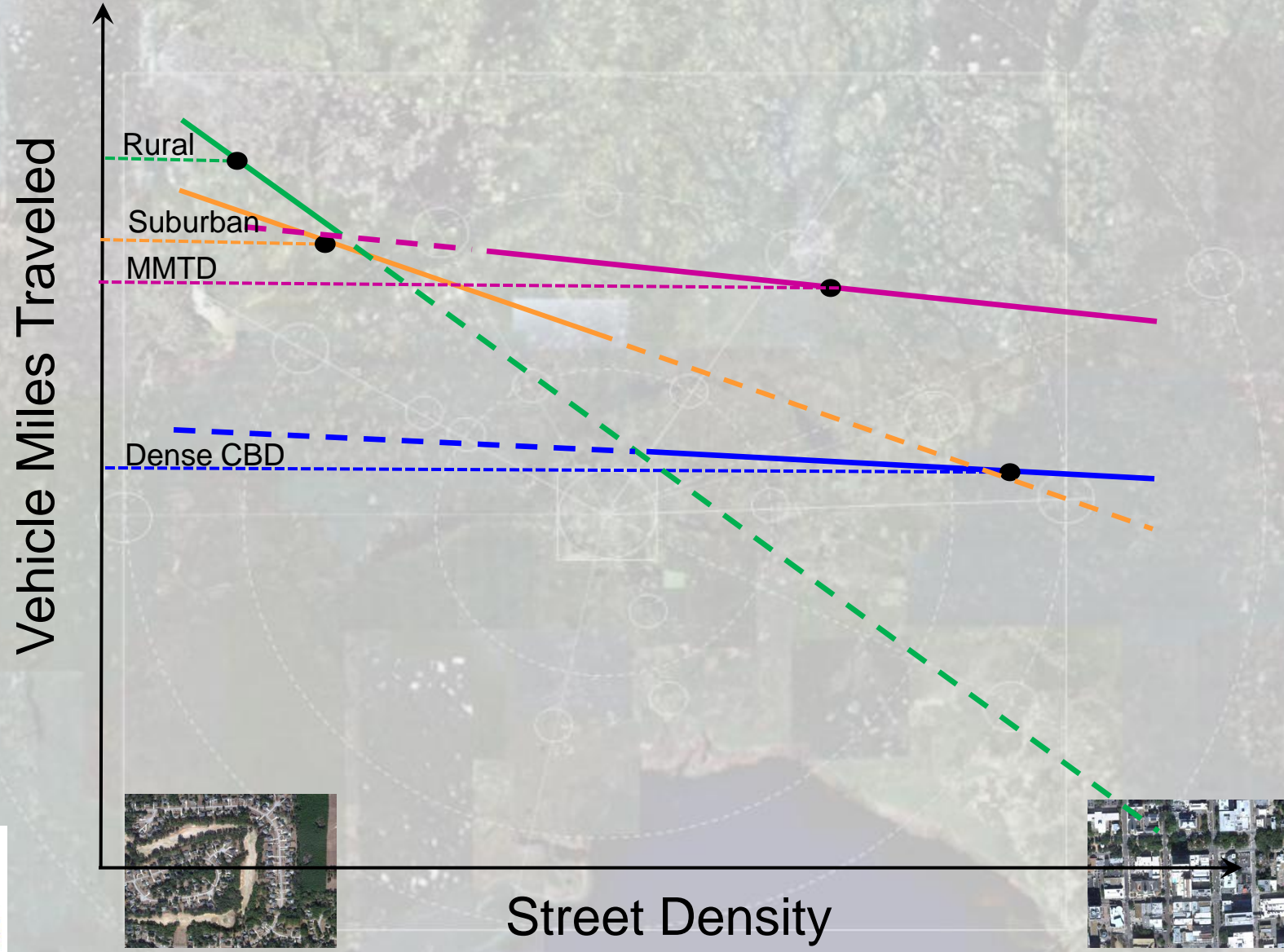
Sustainable Communities Calculator

Research Findings & Status Presentation

April 16, 2012

Sprinkle Consulting

Density (street mileage per square mile)



Diversity – Land Use Mix (entropy) Index

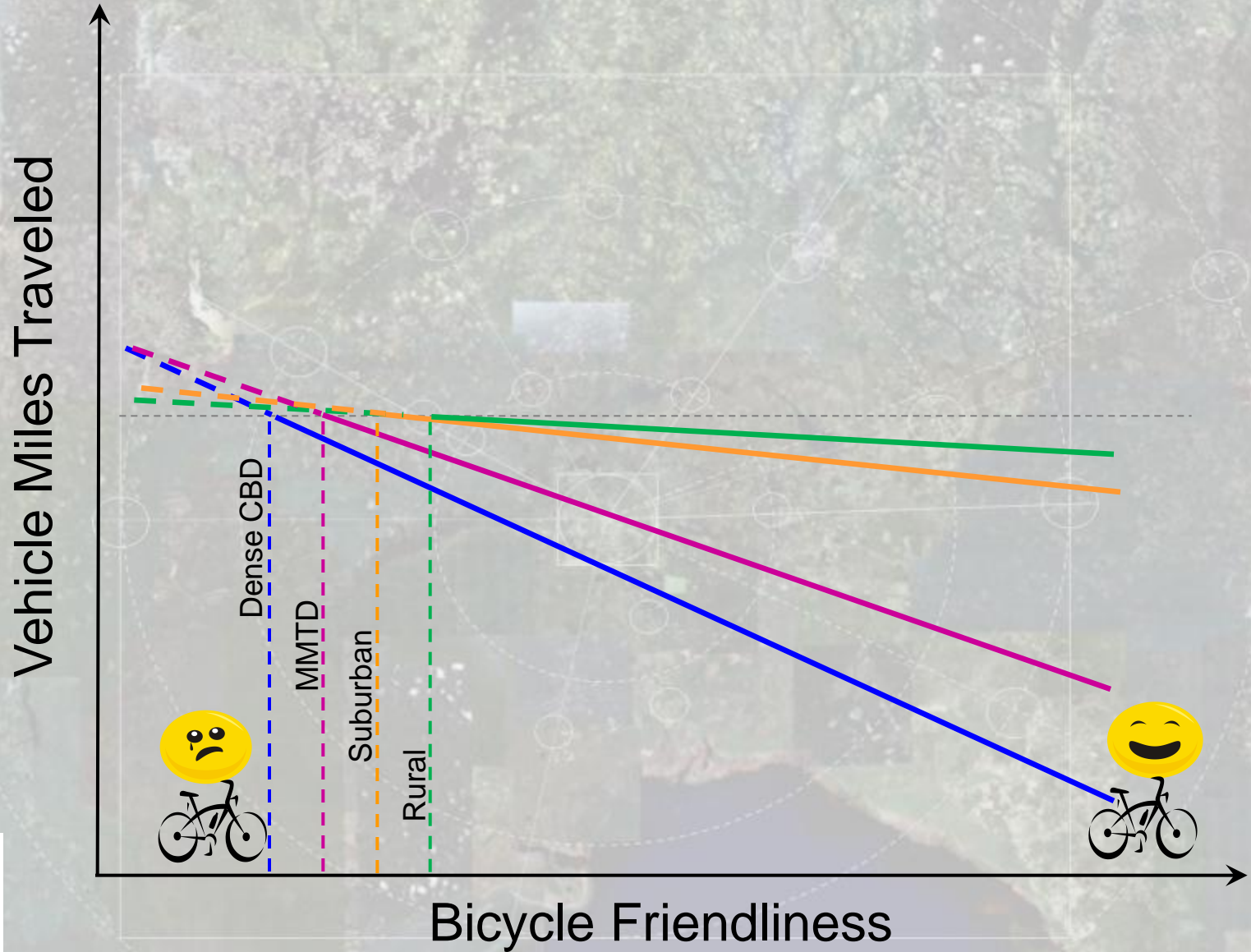


Land Use Mix (Entropy) Index

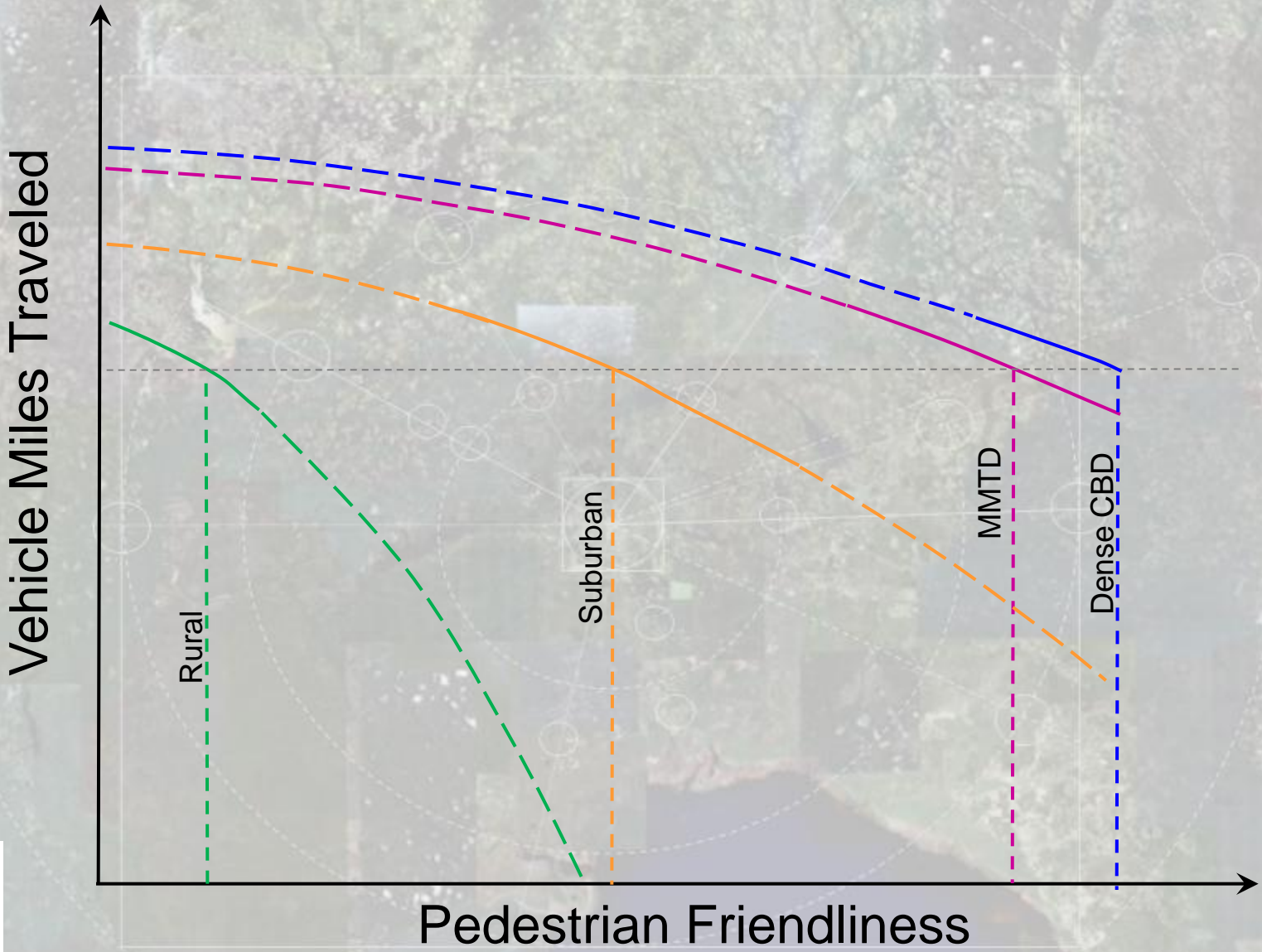
Distance to Transit (nearest stop)



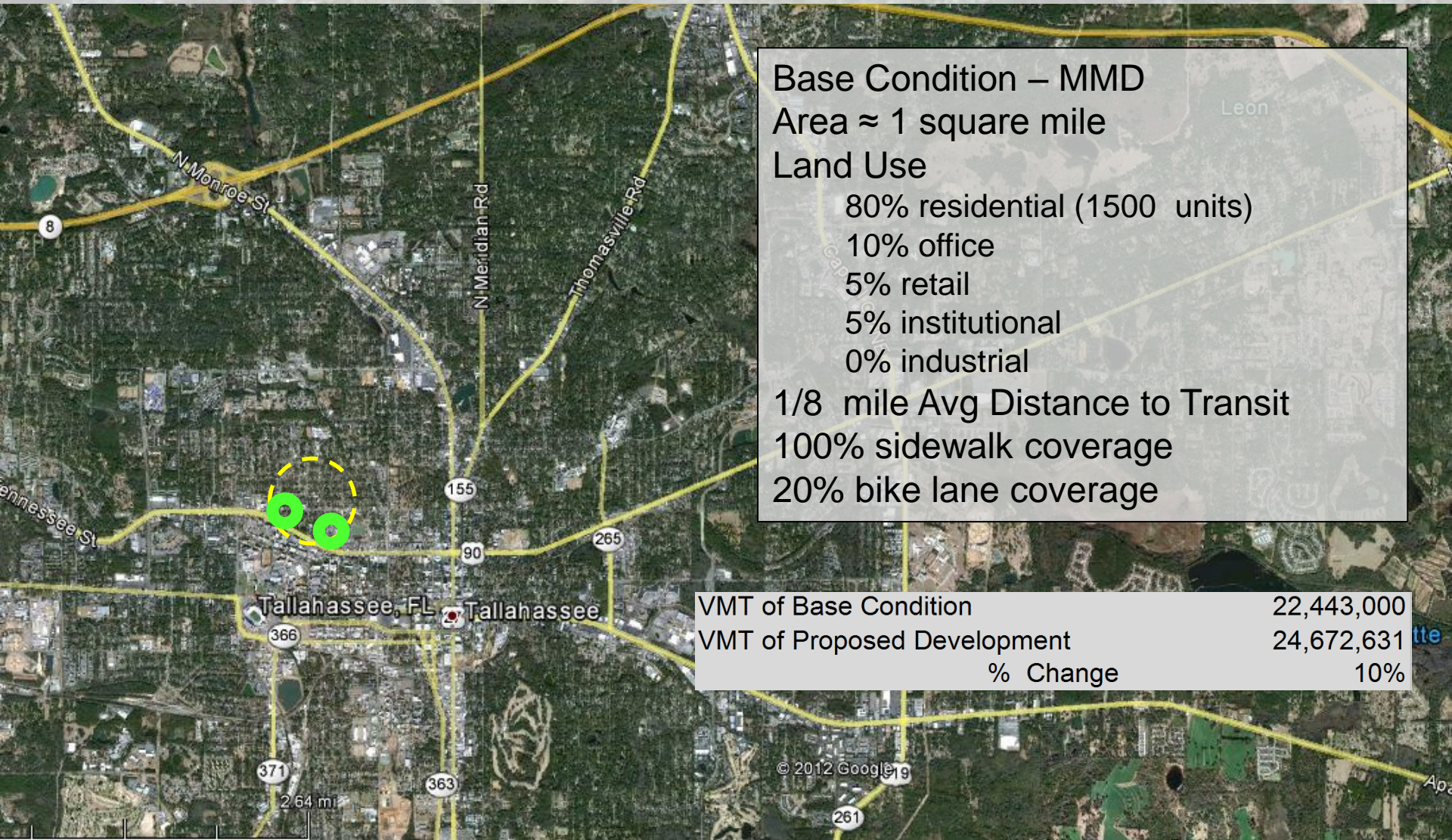
Bicycle Friendliness Modifier



Pedestrian Friendliness Modifier



Southwood – MMTD Setting



Base Condition – MMD
Area ≈ 1 square mile
Land Use
80% residential (1500 units)
10% office
5% retail
5% institutional
0% industrial
1/8 mile Avg Distance to Transit
100% sidewalk coverage
20% bike lane coverage

VMT of Base Condition	22,443,000
VMT of Proposed Development	24,672,631
% Change	10%