

Economic, Water Quality, and Water Supply Benefits of Sustainable Development

Morgan Park Place: A Case Study

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Background

- South Carolina Native, DW Daniel HS, 1993
- BS Systems Engineering, UVA, 1997
- Consultant with American Management Systems, DC, 1997-2004
- MBA, Vanderbilt, 2006
- J. Gowdy Consulting, 2006-2009

Company Info

- Clients: consumer products, diversified products, transportation and distribution, office products, corporate real estate development, residential real estate development, nonprofit, academia
- Work: Strategy Development, Implementation, Marketing & Communications
- Partnered with: Blu Skye Consulting, Strata Environmental, Orchard Advisors

- Tagline: Profitable Sustainability Solutions

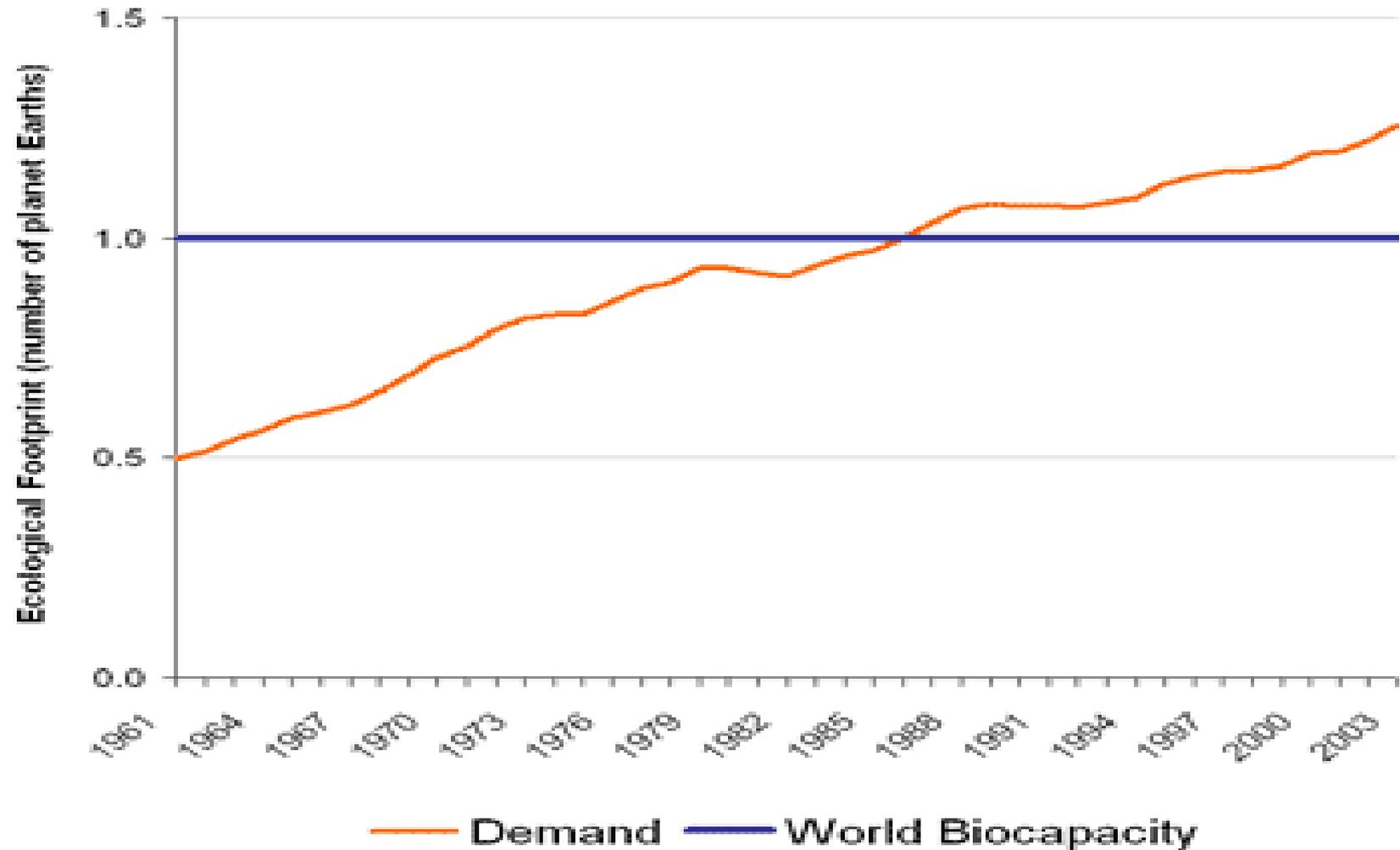
Sustainability, Corporate Social Responsibility, Going Green

- Sustainability - "Development that meets the needs of the present without compromising the ability of future generations to meet their own needs."

- Implication: Use resources equal to or less than the earth's regenerative capacity (biocapacity v. global demand)



Demand vs. Biocapacity



Sustainability, Corporate Social Responsibility, Going Green

- Corporate Social Responsibility
 - Each individual and organization has a role to play in attaining 'sustainability'
 - CSR is the term used for business' role
- Many opportunities are available to implement CSR
 - Philanthropy
 - Community involvement
 - Employee benefits
 - "Going green" options
 - Redefine your business model, mission

Strategy -> Implementation -> Messaging

- Strategy Development - align companies' CSR strategies with business strategy
- Implementation - do specific projects, e.g. join CCX, get LEED certified
- Messaging - create story to improve relationships with stakeholders, e.g. advertisements to customers, newsletters to employees



Economic, Water Quality, and Water Supply Benefits of Sustainable Development

- Site: Morgan Park Place in Germantown, TN (Nashville)
- Focus: Development and building activities that affect water quality and water supply; related financials
- Timeline: analysis conducted after development completed
- Purpose: marketing piece for Lawrence Bros, LLC; educational package for local government and builders, developers, consumers

Organizations Involved

- World Wildlife Fund (WWF) - Provided funding, project review
- Cumberland River Compact (CRC) - Project direction
- Lawrence Bros, LLC - Developer and builder
- J. Gowdy Consulting - Analysis and report creation

Steps Taken During Project

- 1.) Investigation
- 2.) Data Collection
- 3.) Methodology
- 4.) Analysis
- 5.) Report Creation (Peer Review/Final Report)

Step 1

Investigation

- Identify all development and building activities that primarily affect water quality and supply
- Results:
 - Irrigation Systems (drip system, rain sensor, moisture sensor)
 - Water Runoff Control (landscaping, vegetation)
 - Sediment Control (silt fencing)
 - Stormwater Control (rain gardens, gravel pits, pervious pavement)
 - Kitchen Equipment (dishwashers)
 - Laundry Equipment (washing machines)
 - Plumbing (tankless water heater)
 - Efficient Energy Sources (higher SEER HVAC)

Step 2

Data Collection

- Sources
 - Lawrence Bros
 - Subcontractors
 - Local, state utilities (energy, water)
 - Local, state government
- Water - Energy Nexus
 - First four activities: water centric
 - Next three activities: water & energy centric
 - Last activity: energy centric
 - 25 gals water/kwh generated from coal (TVA)
 - Water savings on-site v. water savings for river systems

Step 3

Methodology

- Comparison between “standard practices” in TN and actual practices onsite
 - Standard practice determined with utilities, government, contractors/suppliers
- Water quality, water supply affect of standard practices v. practices done by developer builder
- Cost of standard practices v. cost to developer/builder
- Premium paid, cost savings realized over time, payback period, ongoing cost savings per activity
- Estimations
 - Many ranges exist for estimations
 - Conservative end chosen to avoid overstatement

Analysis

- Report contains eight examples
- One example of on-site Water Supply savings
 - Irrigation Systems
- One example of on-site Water Quality improvements
 - Water Runoff Control
- One example of Water/Energy Nexus
 - Tankless On Demand Water Heater



Water Supply Savings

Irrigation Systems

- Standard: Broadcast System
 - Functionality: no sensors, spray heads
- Actual: Drip Irrigation System
 - Functionality: rain sensor and moisture sensor, drip head

- Water Supply Savings
 - Estimated at 58% efficiency improvement
 - Annual outdoor water usage per condo: 21,900 gals/year (EPA)
 - Total for 40 condos: 876,000 gals/year
 - Apply efficiency --> yields 511,000 gals/year savings

- Financials
 - Standard Cost: \$4,800; Actual Cost: \$6,000
 - Annual Cost Savings: \$1,300
 - Payback Period: 0.9 years

Water Supply Savings

Irrigation Systems

- Metrics per condo
 - Premium Paid: \$30
 - Cost Savings per Year: \$32
 - Payback Period: 0.9 years
 - Water Savings: 12,775 gals/year



Water Quality Benefits

Water Runoff Control

- Standard: Cheapest plants, often invasive species
 - Functionality: Requires synthetic fertilizers for growth
- Actual: Removal of construction debris, high quality compost, compost tea, planting of native species
 - Functionality: No synthetic fertilizers needed or used
- Water Quality Benefits
 - Site goal: zero water runoff
 - If there was runoff --> no synthetic fertilizers into stormwater
- Financials
 - Standard Cost: \$75,400; Actual Cost: \$82,000
 - Annual Cost Savings: \$1,100
 - Payback Period: 6 years

Water Quality Benefits

Water Runoff Control

- Metrics per condo
 - Premium Paid: \$164
 - Cost Savings per Year: \$27
 - Payback Period: 6 years



Tankless On Demand Water Heater

- Standard: 52 gallon water heater
- Actual: Rinnai on demand heater
 - Provides 30% energy efficiency improvement
 - Savings of 623 kwh/condo

- Water Supply Savings
 - 25gals per 1 kwh (coal)
 - Result: 15,565 gals/condo
 - Site Total: 622,620 gals/year

- Financials
 - Standard Cost: \$380; Actual Cost: \$875
 - Annual Cost Savings: \$77
 - Payback Period: 6.4 years

Water Quality Benefits

Water Runoff Control

- Metrics per condo
 - Premium Paid: \$495
 - Cost Savings per Year: \$77
 - Payback Period: 6.4 years



Summary Findings

Water Supply Savings

- Total estimated water supply savings: 2,950,000 gals/year

Irrigation Systems: 511,146

Water Runoff Control: 438,000

Sediment Control: N/a

Stormwater Control: N/a

Kitchen Equipment: 128,200

Laundry Equipment: 703,400

Plumbing: 622,620

Efficient Energy Sources: 551,000

Water Quality Benefits

- Water Runoff Control: Zero synthetic fertilizer runoff
- Stormwater Control: 80-90% reduction in silt particulate runoff
- Other six activities: no affect on water quality

Summary Findings

Financials

- Overall Premium Paid: \$78,000
- Premium Per Condo Owner: \$1,950
- Annual Cost Savings per Condo Owner: \$400
 - Irrigation Systems: \$32
 - Water Runoff Control: \$27
 - Sediment Control: N/a (**)
 - Stormwater Control: N/a (**)
 - Kitchen Equipment: \$17
 - Laundry Equipment: \$75
 - Plumbing: \$77
 - Efficient Energy Sources: \$171
- Payback Period: 4.9 years

(**) No Premium; upfront cost less than standard cost

Points to Remember

- Breadth: more activities could be included
 - Shower heads, faucets, toilets
 - Any appliance that uses energy
- Geography: local, state prices vary
 - Products
 - Services
 - Utility rates
- Estimations: try other values within ranges
 - Mid range estimation
 - Liberal estimation
 - Payback period would decrease from 4.9 to ?

Thank You.

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