Tour of Devens - Points of Interest (see reverse for additional details)

1. Devens Common
2. Guild of St Agnes
3. Transitions
4. Daylighting Willow Brook (Jackson Road future upgrades)
5. Parker Charter Shriver Job Corps
6. Routhier
7. DPW Municipal Service Center - Public Works Department
8. Devens Recycling
9. Southern Container
10. Sonoco-Gillette
11. Waiteco
12. Evergreen Solar
13. US Army
14. Magna Motion
15. Red Tail Golf Course
16. Devens Open Space
17. Bristol Myers Squibb
18. One Jackson
19. American Superconductor
20. Grant Road future housing
21. Eglish Designs
22. Rogers Field
23. Image Software Services
1 Devens Common:
- Hotel, working to become EcoStar Achiever
- Investigating composting, instituting comprehensive in-room hotel recycling program to complement existing efforts, worn linens reused through EcoWatch program.
- All buildings in complex - roof run-off goes into system for reuse for irrigation
- All services within ½ mile of all residents in Devens

6. JP Routhier & Sons:
- Tire recycling and reuse for various engineering projects (roadway construction), agriculture (animal mats) and recreation (Playground surfaces)
- Recognized by the US EPA for recycling and education on uses of recycled tires

11 Waiteco:
- Bubble wrap exchange with Parker Hannifin
- Working to become EcoStar Achiever
- Box reuse
- Waste oil minimization

16 Devens Open Space:
- 2600 acres incl. Oaktree National Wildlife Refuge, floodplain of the Nashua River (green infrastructure)
- 500 acres of active recreation fields
- 70 acre Mirror Lake features swimming and fishing
- Trail system – form of green infrastructure – connecting people, nature and development
- Environmental restoration

21 Egomised Designs:
- Partnering with other business on - central distribution – sharing trucking to keep full loads both coming and going – CT, MA and NY routes
- Donations of imperfect gifts and materials
- Toxic Use Reduction (lead)
- Adaptive building reuse
- Zero Waste

22 Rogers Field Landscaping Practices:
- Sandy terrain difficult for grass growth—solution: Bicompost—decomposed wood chips, yard waste, galium and other biosolids that absorb and retain water, creating a stress-resistant surface friendly to grass & earthworms but not weeds
- Saves 2,400,000 gal of water/y and reduces chemical fertilizer use by $43,000/y

23 Image Software Services:
- Material re-use (packaging, cdf’s, paper, containers, binders spirals)
- Recycling 90% of paper
- First EcoStar Achiever
- Promotes use of eco-friendly paper to customers
- Business to Business Mentoring and Community Involvement
- Employee profit sharing

3 Devens Dept. of Public Works:
- Free recycling for business & residents (3 tons/month)
- Negotiated recycling contract for all businesses
- HHH Disposal for business & residents (developing)
- Shared equipment & vehicle maintenance for Fire, Police, Municipality and offered to neighboring towns
- State of the art wash water recycling unit
- On EcoStar Steering Committee

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8 Devens Recycling:
- Recycling wood, gypsum, asphalt, concrete
- Material exchange and reuse (chipping wood waste for biomass energy)
- Co-location and by-product exchange opportunities
- Combined heat and power generation
- Multi-Modal access

9 Southern Container:
- Product take back, deploying roll-offs at their clients facilities to capture waste corrugated for reuse.
- Introduced to EID when we discussed exchange with WEBIAN converted from 7 grocery stores
- Shared employee discussions with Horn Packaging for driver and with Parker Hannifin for machinists
- WPI interns-boiler efficiency study

12 Evergreen Solar:
- Tuxic Toxic Reduction – UMASS TURI
- Portion of fees to create revolving energy conservation and renewable energy loan fund
- Reuse breakage as solar garden lights
- Less silicone per watt by half that nearest competitor (string ribbon technology)
- White roof - solar array on roof – possible solar parking canopies
- LED techniques for stormwater

13 US Army:
- $100M training and facility – LEED Silver
- 3 buildings – 280,000 sq ft on 57 acres
- 600 Soldiers & Marines – 800 military vehicles
- Drinking water well protection – re-designed layout to avoid impacts
- LED incorporated where possible (some soil contamination – restrictions for infiltration)

14 Magna-motion:
- Magnetic levitation systems development—trains float over a guideway using basic principles of magnets to replace the old steel wheel and track trains
- Alternative transportation mode – non-fossil fuel based
- Magnetic field created by the electrified coils in the guideway walls & the track combine to propel train down the track

18 Apex Properties:
- Adaptive re-use (green building)
- LEED (biofiltration landscape islands, grass-lined swales, rain gardens (planning), phased parking)
- Connecting into Devens Trail system
- MI Wachusett Community College Job Training for BioPharma BMS
- Investigating geothermal

20 Grant Road future housing:
- Integrated Pest Management
- Green infrastructure

24 Electromagnetic Energy:
- Magnetic field created by the electrified coils in the guideway walls & the track combine to propel train down the track

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Business Linkages:

Peter Lowitt, AICP

Devens, MA
Industrial Symbiosis approach to minimizing environmental impacts

- Industrial symbiosis engages traditionally separate industries in a collective approach to competitive advantage involving physical exchange of materials, energy, water, and/or by products. The keys to industrial symbiosis are collaboration and the synergistic possibilities offered by geographic proximity.

M. Chertow 2000
Annual Review of Energy and Environment
Charrette Broke into Groups

All plans considered sustainability an integral part of the base development and functioning.

Three groups focused on industrial ecology and a zero-emissions, no waste system, similar to a biological community.

All teams agreed on protecting the aquifer at Devens, cleaning up the site, implementing sustainable agriculture, and implementing a comprehensive recycling strategy.
Eco-Industrial Initiatives 2004
The Burnside Ecosystem Model

Influences

- Policy: Waste as Resources
- Regulations: Landfill bans
- Economic Instruments: Tipping Fees
- Information: Eco-Efficiency Centre

The diagram shows a flowchart of various companies involved in recycling and manufacturing, including:

- Manufacturing Company
- Recovery Company
- Repair Company
- Recycling Company
- Rental Company
- Remanufacturing Company
- Reclamation Company
- Reuse/Resale Company
- Service Company
- Distribution Company
- Manufacturing Company

Items and waste categories include:

- Metals, Paper, Cardboard, Plastic
- Electronics, Computers, Electric Tools, Truck Engines
- Construction Uniforms, AV Equipment, Scaffolding
- Building Materials, Auto Parts
- Composting, Oil, Solvents
- Toner Cartridges, Radiators, Tires
- Tools, Building Materials, Office Furnishings, Computers
Cement industry exchanges by-products with other industries.

Pulp and paper
- Paper sludge, clay

Iron and steel
- Blast furnace and steel slags

Electric power plant
- Fly ash and FGD (gypsum)

Non-ferrous metals foundry
- Silica fume, gypsum, spent pot liner, slag (aluminum)

Slaughterhouse and meat processing
- Meal, bone and fat

Food processing and beer brewing
- Beer sludge, waste filtering material, rice hulls

Municipal waste facility
- Scrap tires, wastewater sludges, MSW incinerator ash

Automobile scrap reprocessing
- Shredder residue

Auto manufacturing
- Foundry sand, waste paint

Municipal heating
- Waste heat

Secondary smelter
- Nickel, zinc, copper, lead,

Kiln dust

Road construction

Sustainable Cement Facility

Electric power plant

Tire dealer or manufacturer

<table>
<thead>
<tr>
<th>Components of EID</th>
<th>Materials</th>
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<td>• Common buying</td>
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<td>• Customer/supplier relations</td>
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**Materials**

- Common buying
- Customer/supplier relations
- By–product connections
- Create new material markets

**Energy**

- Green buildings
- Energy auditing
- Cogeneration
- Spin-off energy firms
- Alternative fuels

**Human Resources**

- Recruiting & benefit packages
- Wellness programs
- Common needs (payroll, security, maintenance, training)
- Flexible employee assignment

**Transportation**

- Shared commuting
- Integrated logistics
- Shared/coordinated shipping
- Common vehicle maintenance
- Intra-park transportation

**Marketing**

- Green labeling
- Accessing green markets
- Joint promotions (advertising/trade shows)
- Recruiting new companies

**Production Processes**

- Pollution prevention
- Scrap reduction and reuse
- Production design
- Common subcontractors/equipment
- Technology sharing & integration

**Information and Communications**

- Internal communications systems
- External information exchange
- Monitoring systems
- Computer compatibility
- Joint MIS systems for Park Mgt

**Environ, Health & Safety**

- Accident prevention
- Emergency response
- Waste minimization
- Multimedia planning
- Shared environ. Info. systems

**Quality of Life / Community Connections**

- Integrating work & recreation
- Cooperative education programs
- Volunteer / community programs
- Involvement in regional planning

**Waste Management**

- Collection / hauling
- Recycling
- Re-refining (chemicals & oils)
- Composting

**Product Lifecycle**

- Product take-back
- Design for Environment
- Remanufacturing
- Dematerialization
- Alternative packaging

Cornell University - WEI