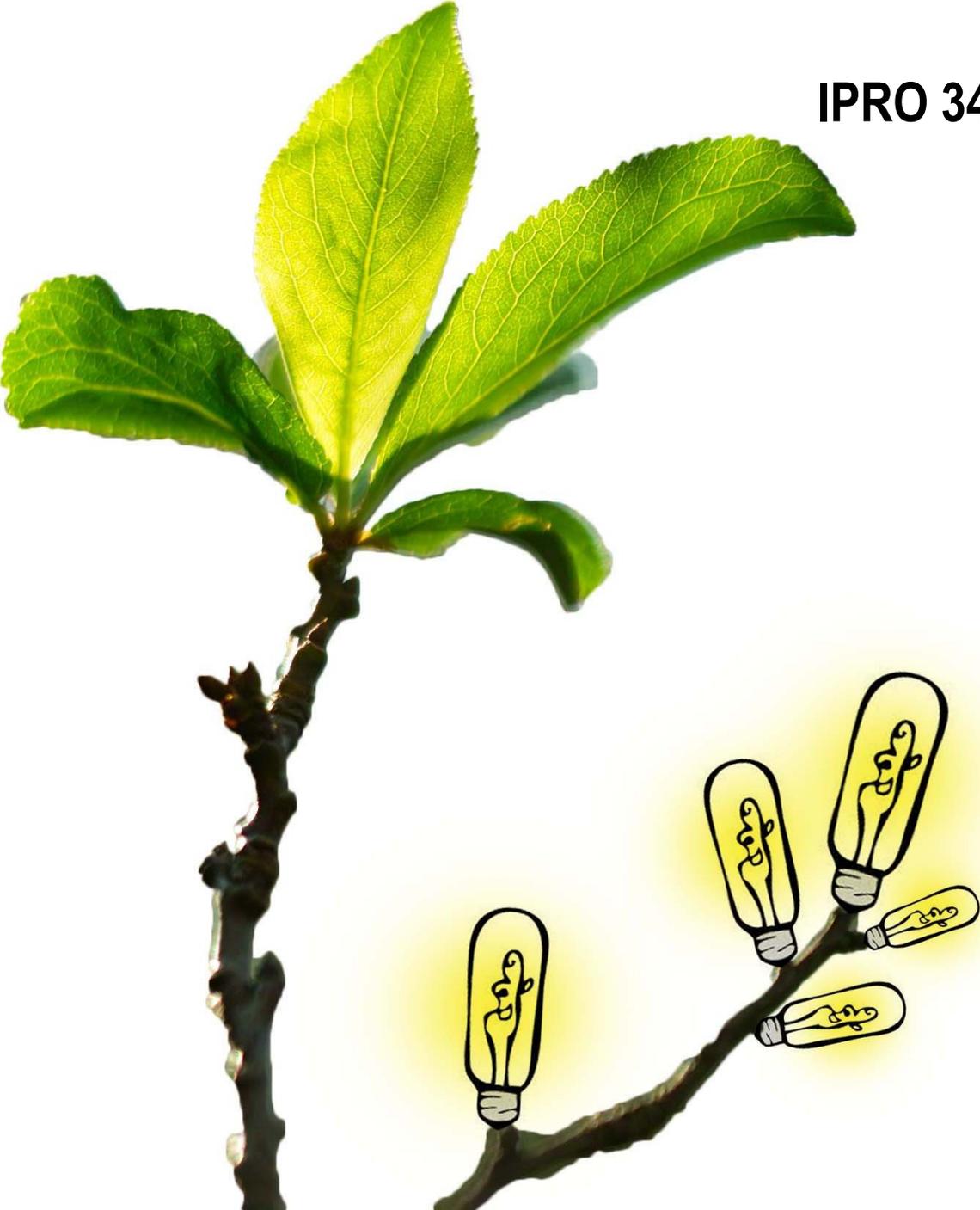
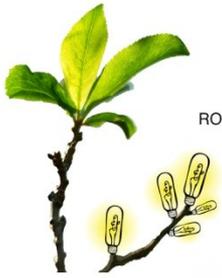


I PRO 347: Robbins Community Power
Wood Utilization Study





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Background

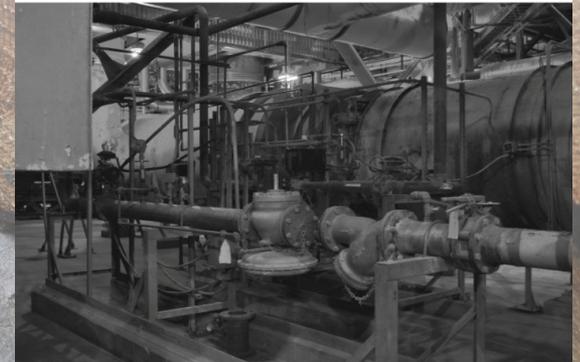
Continuation of previous IPRO

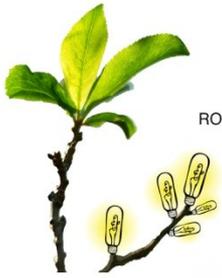
- Original configuration of Robbins Community Power

Municipal Solid Waste ü Energy

- Future Configuration of Robbins Community Power

Chipped Wood ü Energy
-75% Construction Waste
-25% Green Wood



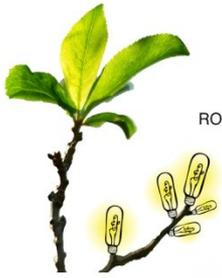


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Problem

Scope of Project

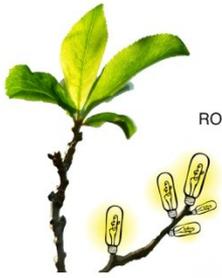
- A large percentage of urban wood is underutilized: chipped into mulch or compost, or disposed of in a landfill
- The goal of this IPRO is to determine and designate a higher value to this urban wood.
- This “green” wood is necessary fuel for Robbins Community Power Plant
- Other uses include processing this wood into lumber or producing wood pellets for boilers.



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Goals

- Provide an alternative for municipalities and landscaping companies to dispose of the urban wood by providing incentives for their participation in the recycling of the wood.
- Determine the highest value of wood and process it accordingly.
- Supply Robbins Community Power with enough green wood to fuel their boiler



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Team Structure

- **Tasks:** Based on the work needed to accomplish our goals, we divided work amongst our team as follows.
 - Chicago's Urban Forest
 - Sawmill Processes
 - Sawmill Program
 - Site Logistics
 - Budgeting
 - Licensure
 - Equipment
 - Wood Boilers / Pellets
- **Structure:** Because of the variety of duties, each member is responsible for a specific aspect of the project. Goals are set for each member based on class discussions and each member reports on his/her findings on a class-to-class basis.

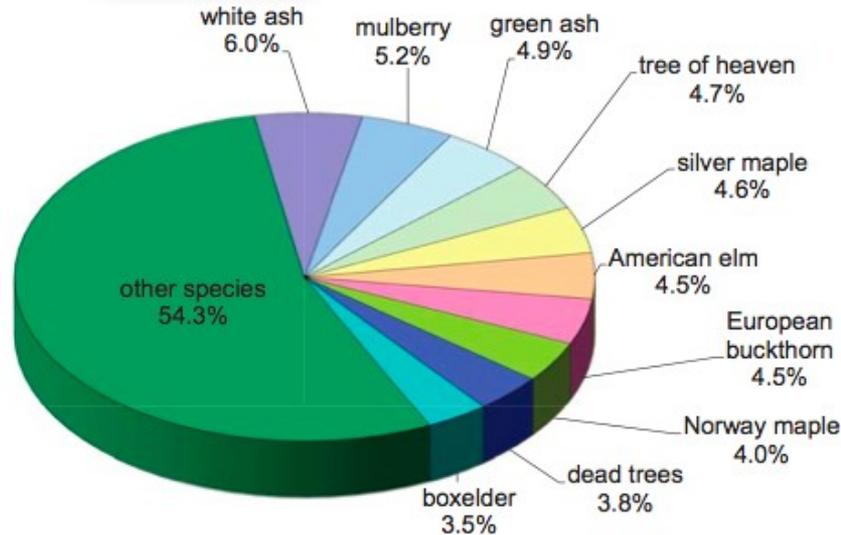


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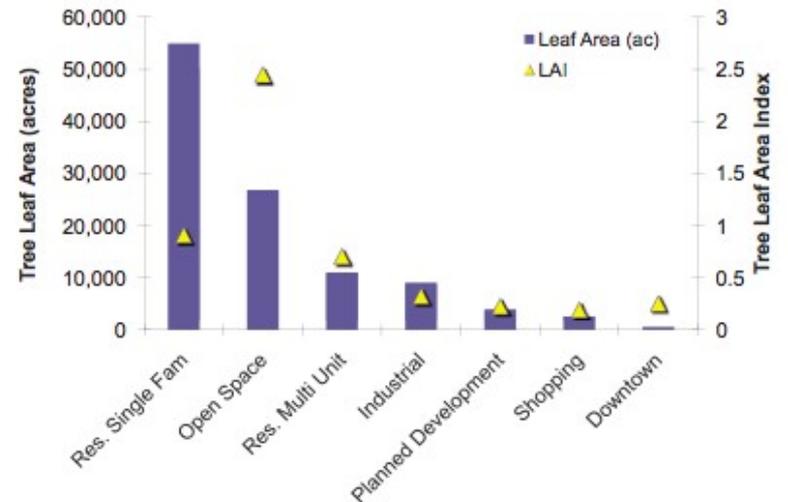
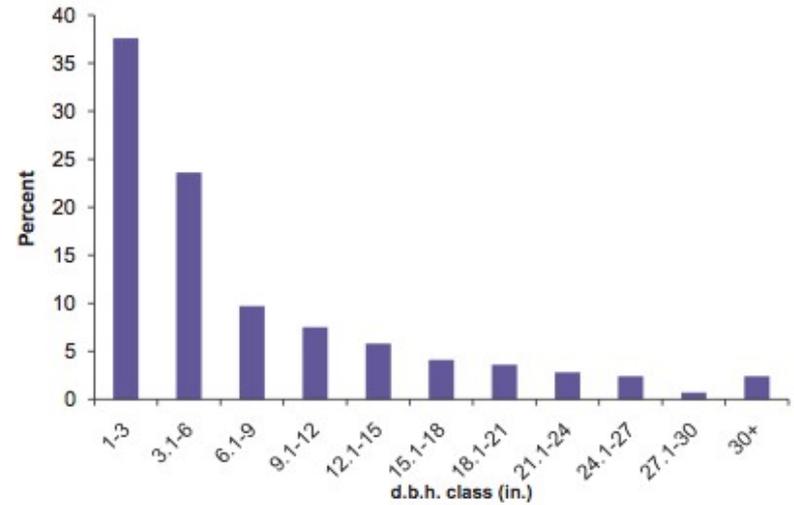
Chicago Urban Forest Summary

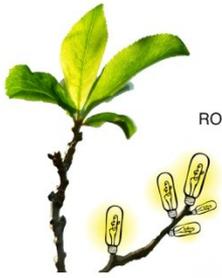
Feature	Measure
Number of trees	3,585,000
Tree cover	17.2%
Most common species	white ash, mulberry, green ash, tree-of-heaven
Percentage of trees < 6-inches diameter	61.2%
Pollution removal	888 tons/year (\$6.4 million/year)
Carbon storage	716,000 tons (\$14.8 million)
Carbon sequestration	25,200 tons/year (\$521,000/year)
Building energy reduction	\$360,000/year
Increased carbon emissions	-\$25,000/year
Structural value	\$2.3 billion

Ton – short ton (U.S.) (2,000 lbs)



Chicago's Urban Forest





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Log Grading

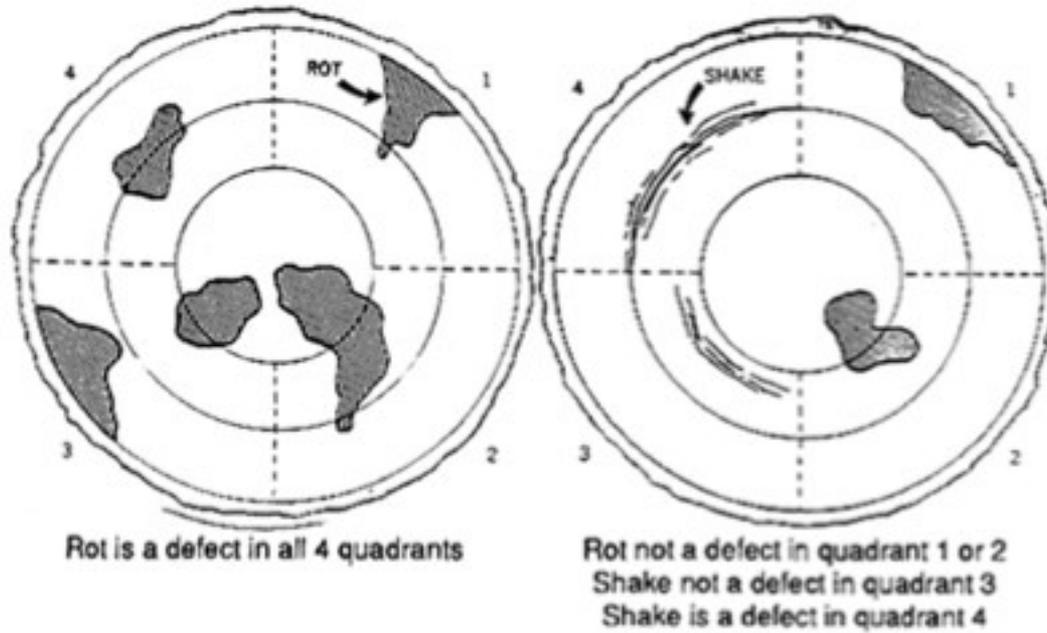
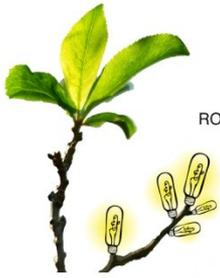


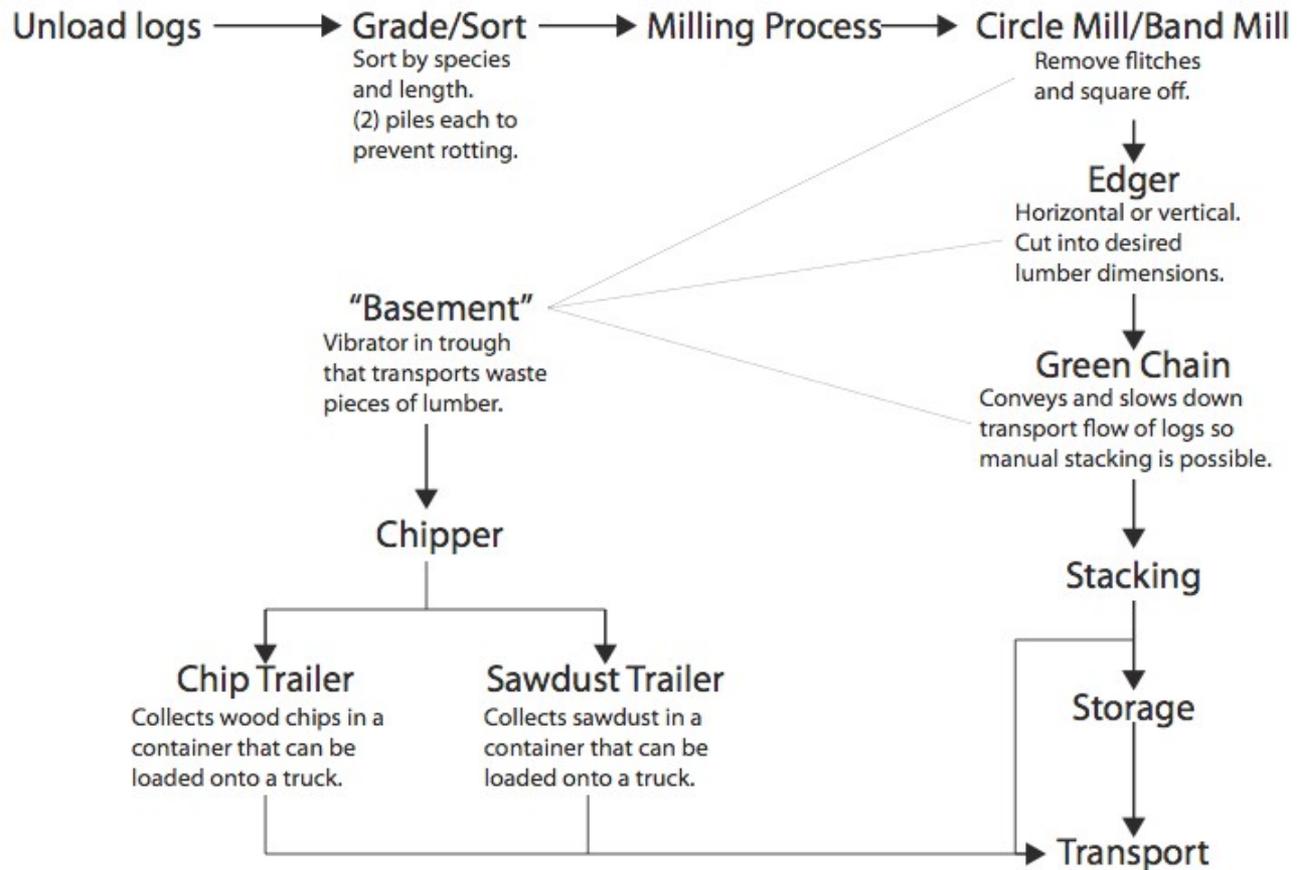
Figure 1. Example evaluation of rot and shake.

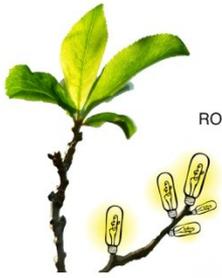




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Sawmill Processes

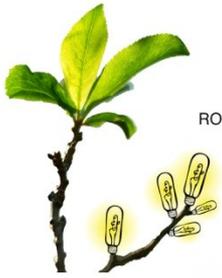




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Sawmill Program

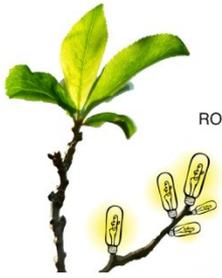
- **Main Drive** - *beneficial to have separate in and out paths*
- **Log Inventory** - *organize according to species and length*
 - *rick sizes vary according to how the logs are being stacked and organized*
- **Trailers** - *sawdust, chips*
 - *48 ft trailer needs 61-62 ft radius circulation*
- **Unloading Area** - *sorting*
- **Parking Lot**
- **Office with Restroom**
- **Sawmill** - *Machinery, manufacturing*



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Site Development

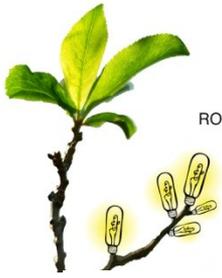
- Prefabricated 200'x250'x16' steel building to house equipment and office
- Site will be at least 10 acres and also include:
 - Unloading, loading, sorting, and inventory areas
 - Main drive and parking
 - Outdoor drying and storage areas
 - Dust/chip trailers



ROBB'S COMMUNITY POWER
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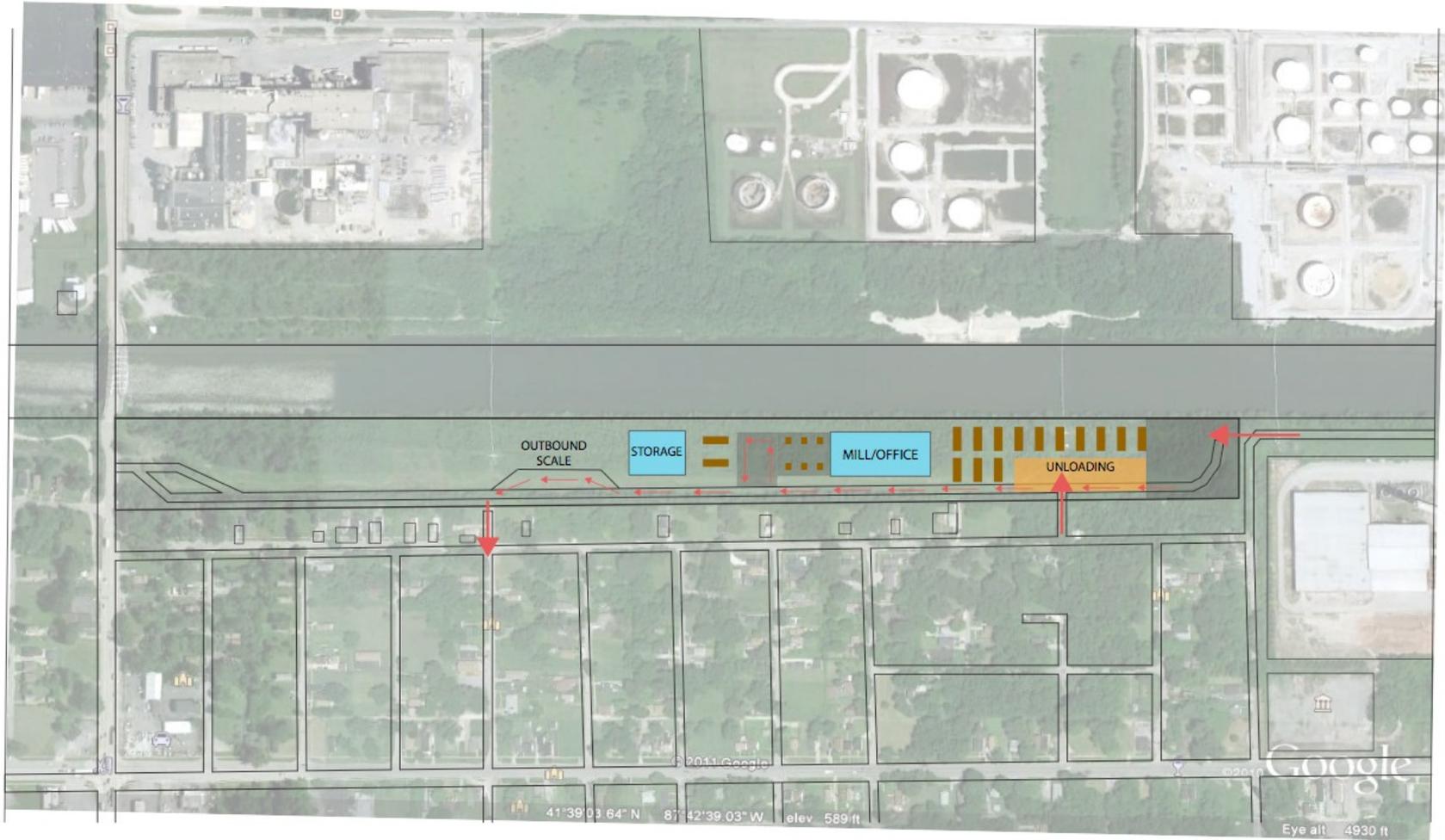
Proposed Site

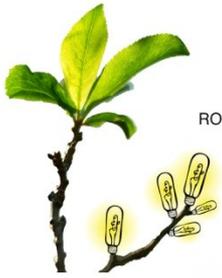




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Proposed Layout

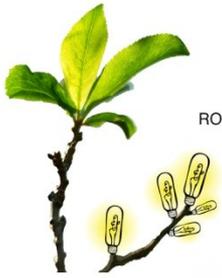




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Equipment Selection and Pricing

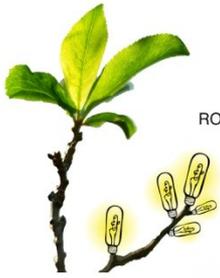
- **Impact of Equipment:**
 - **Price:** relates directly to budget
 - **Operating Space:** size of machinery drives storage requirements
 - **Logistics:** mechanical performance of machines impacts organization of process
- **Methodology:**
 - **Determine need:** involves developing “big picture” of operations and determining all equipment necessary to fulfill goals
 - **Sample cost:** research various avenues for acquiring equipment, taking a wide sampling of used prices
 - **Optimize:** using manufacturer spec sheets, determine which products meet needs and which do not
 - **Decide:** either select the exact product (specific) or settle on price range (general)



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Equipment List

- Tub Grinder
- Kiln
- Sawmill (Bandmill)
- Edger
- “Basement”
- “Green Chain”
- Rough Terrain Forklift
- Front End Loader
- Truck Scale
- Grapple Truck
- Semi-Trailer
- Bobcat



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Licenses and Permit

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- Tax Registration
 - Employer Identification Number (EIN)
 - Illinois Tax Registration
 - Business Licenses
 - Local Permits
 - Business
- Equipment/Training Permit
- Air Pollution Permit
 - Environmental Regulations for the State of Illinois
 - Title 35 of the Illinois Administrative Code
- Waste Management's Permit
- Water Pollution Control Permit
- Public Water Supply Permit
- Livestock Import/export Permit
- Land Pollution Control Permit



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Challenges

- **Communication:**
 - We are relying on many sources outside of RCP to obtain necessary information. Efficient communication can be difficult, especially when they are not directly included in the project.
 - Oftentimes the nature of our questions requires complex answers, making it necessary to arrange meetings which requires more time.
- **Resources:**
 - This project requires a significant amount of research and human resources are relatively small.
 - This project has a long term focus whereas the IPRO timeframe is relatively short.



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General Status

We are making good progress toward our goals. We have achieved a clear understanding of what needs to be done and everybody is consistently fulfilling their roles. Especially considering the time/human limitations, our progress is strong.