RADIAL 16 CANAL AND ROAD BETWEEN 5TH RING AND 30TH DE AGOSTO CURICHI
International Senior Design

- Walter Henry School
- Design Project
Introduction

- International Senior Design 2008
- Tip Third Engineering
Outline

- Santa Cruz, Bolivia
- Project Site
- Methods and Procedures
- Design Options
- Final Recommendation
- Cost Benefit Analysis
- Conclusion
- Questions
General Background
Project Background
Methods and Procedures
Santa Cruz, Bolivia
Michigan Technological University

- Water calculations
- Roadway calculations
- Project estimate and schedule
- AutoCAD drawings
Watershed
Existing Conditions
30th de Agosto Curichi

- Formation
- Landfill
- Rainy Season
- Curichi Health
Existing Conditions
Canal Design

5th Ring Intersection and Existing Catch Basin

Curichi

Section Under Road At 5th Ring
Canal Design Options

- Canal
  - Underground Pipe
  - Earthen
  - Concrete Lined
Underground Pipe

- Slope/Grade
- 5th Ring Intersection
Earthen Canal
Concrete Lined Canal
Canal Layout

- Box Culvert/Catch Basin Transition
- Canal/Box Culvert Transition
- Canal Section
- Inlet at Curichi
- Box Culvert Section
- Catch Basin and Extension
Canal Summary
Canal Summary
Canal Recommendation

- **Open Canal**
  - 1 kilometer
  - 126 Days (1 Construction Season)

- **Box Culvert**
  - 11 meters
  - $364,000 (2,543,000 Bolivianos)

- **Box Culvert / Sediment Trap Extension**
  - 14 meters
Road Design Options

- Road
  - Asphalt
  - Gravel
  - Concrete
Asphalt Pavement

Advantages

- Less maintenance than gravel road
- Less dust than gravel road
- Easier maintenance than non-reinforced concrete pavement

Disadvantages

- High Initial Cost
- Poor resistance to fatigue failure
- Availability of Equipment
Gravel Road

Advantages
- Relatively low initial cost
- Constructed using simple equipment

Disadvantages
- Requires continuous maintenance
- Dust
- Sediments entering canal
Non-Reinforced Concrete Pavement

Advantages
- Durable
- Low maintenance
- Experienced labor
- Bolivian Standard

Disadvantages
- Higher initial cost
- Expensive to repair
Road Recommendation

- Non-Reinforced Concrete Road
  - $395,000 (2,764,000 Bolivianos)

  OR

- Temporary Gravel Road
  - $76,000 (527,000 Bolivianos)
  - ~20% Cost of NRC
  - Future Base
Benefits
Conclusion

- In Santa Cruz
- In Houghton
- Overall Experience
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Aerial Engineering
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More Information Available
Questions?