



Avda. FLAMINGO
301 - 400

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Introduction

Who?

- Wild West Engineering (WWE)

What?

- International Senior Design Team

Where?

- Santa Cruz, Bolivia

When?

- July 26th – August 5th

Why?

- Alleviate flooding and improve living conditions

Outline

- Background
- Existing Conditions
- Methods
- Design Options
- Recommendation
- Benefits
- Conclusion



Background

Santa Cruz



Bolivia

Flamingo Neighborhood



BOLIVIA

- Politics
- Economy
- Education



SANTA CRUZ

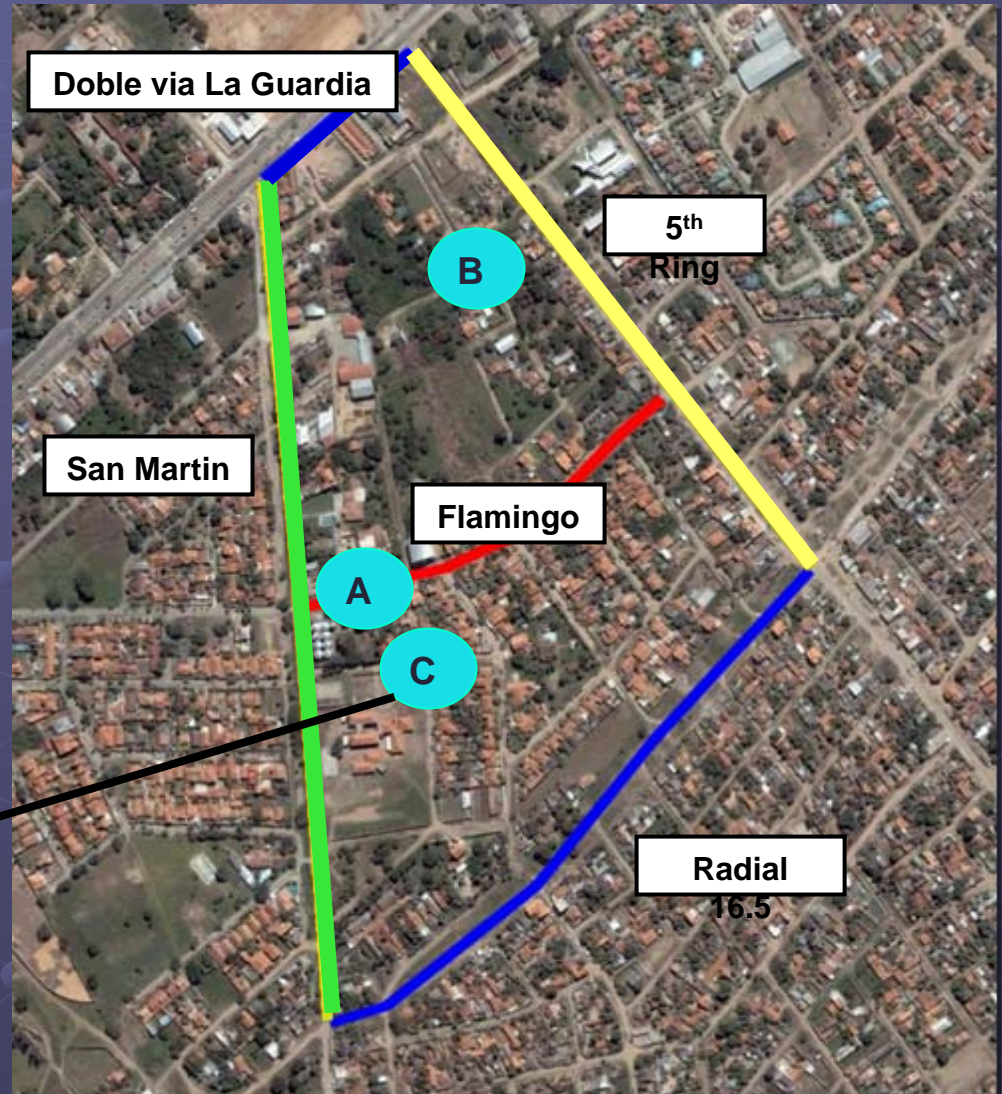


La Flamingo Neighborhood

Google

FLAMINGO NEIGHBORHOOD

- Dense Population
- Residential Area
- Flooding
 - . Up to 2 feet
 - . Bacteria/Mold Growth
 - . Mosquitoes



Existing Conditions



Flamingo Avenue



SAN MARTIN CANAL

N

PAVED CANAL

Doble via La Guardia

Earthen Canal

FLAMINGO AVENUE

FLAMINGO SCHOOL

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CONCRETE CANAL ALONG SAN MARTIN

SAN MARTIN CANAL

N

Paved Canal

5th Ring Road

Doble via La Guardia

EARTHEN CANAL

FLAMINGO AVENUE

FLAMINGO SCHOOL

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EARTHEN CANAL ALONG SAN MARTIN

5th Ring Canal





5th Ring & 16.5 Road Intersection



5th Ring Canal Northbound

Preparations

● Pre-trip

- Research
- Meetings
- Professional Mentors

● In Bolivia

- Meetings with Officials
- Toured Neighborhood



Surveying

- Topcon Total Station
- Cross Sections
- Saguapac



Soil Analysis

- Soil Samples
- Hydrometer

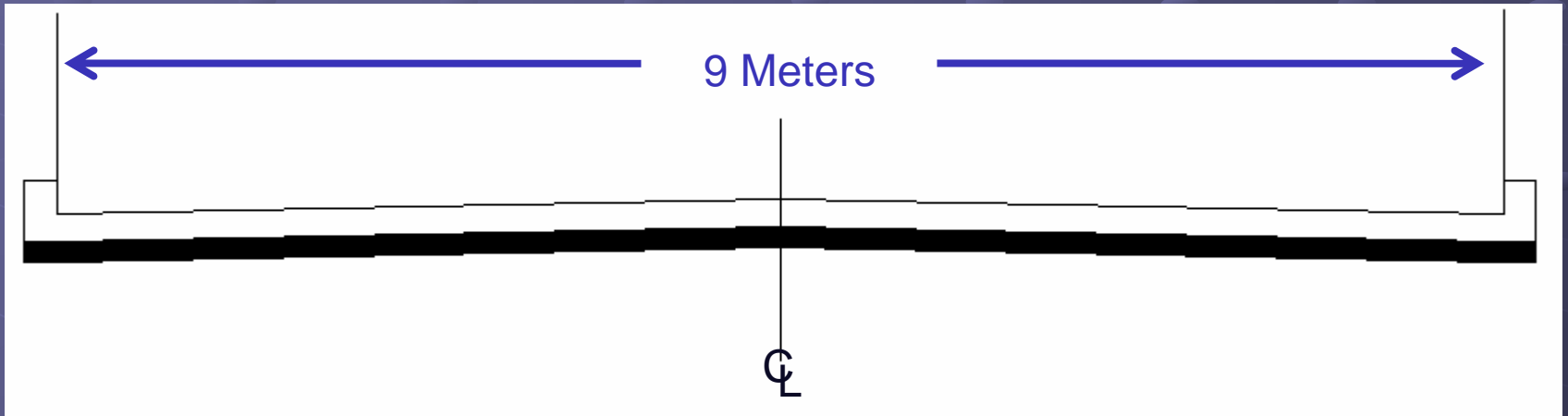


Design Options

- Paving Flamingo Avenue
- Redesign 5th Ring Canal
- Water Drainage



Flamingo Ave Proposed Cross Section



Flamingo Avenue

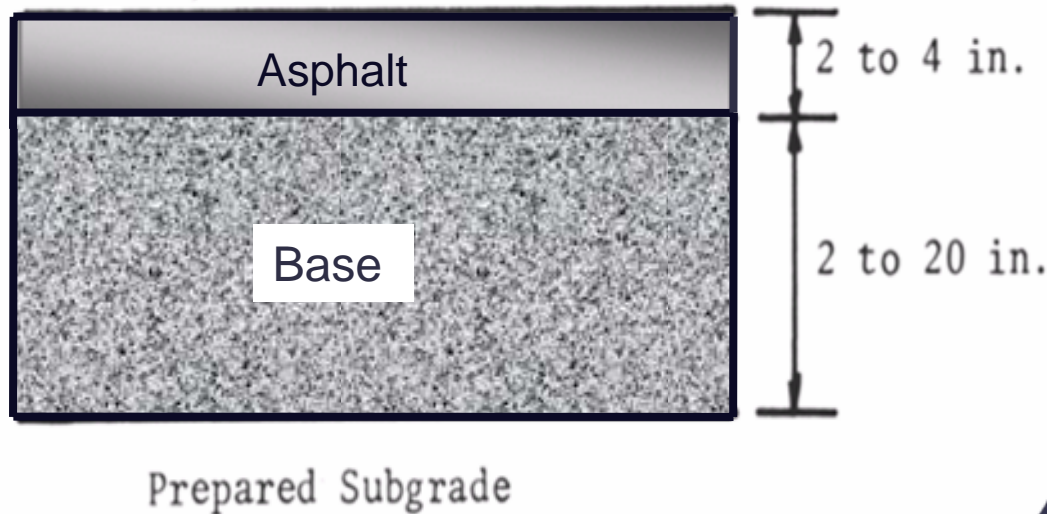
Pavement Option - Asphalt

● Advantages

- Less Expensive to Place

● Disadvantages

- Uncommon
- Maintenance
- Not used for Avenues



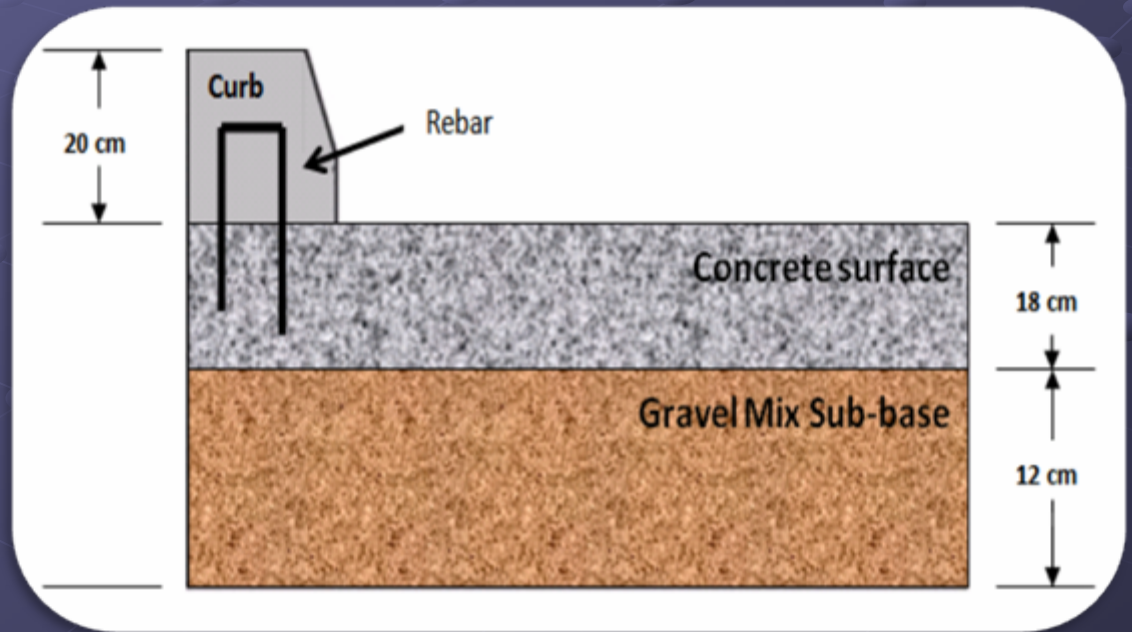
Flamingo Avenue Pavement Options - Concrete

● Advantages

- Common for avenue construction
- Longer Life
- Appearance
- Preference

● Disadvantages

- More expensive



5th Ring Canal



Existing Cross Section



Proposed Cross Section

Drainage Design



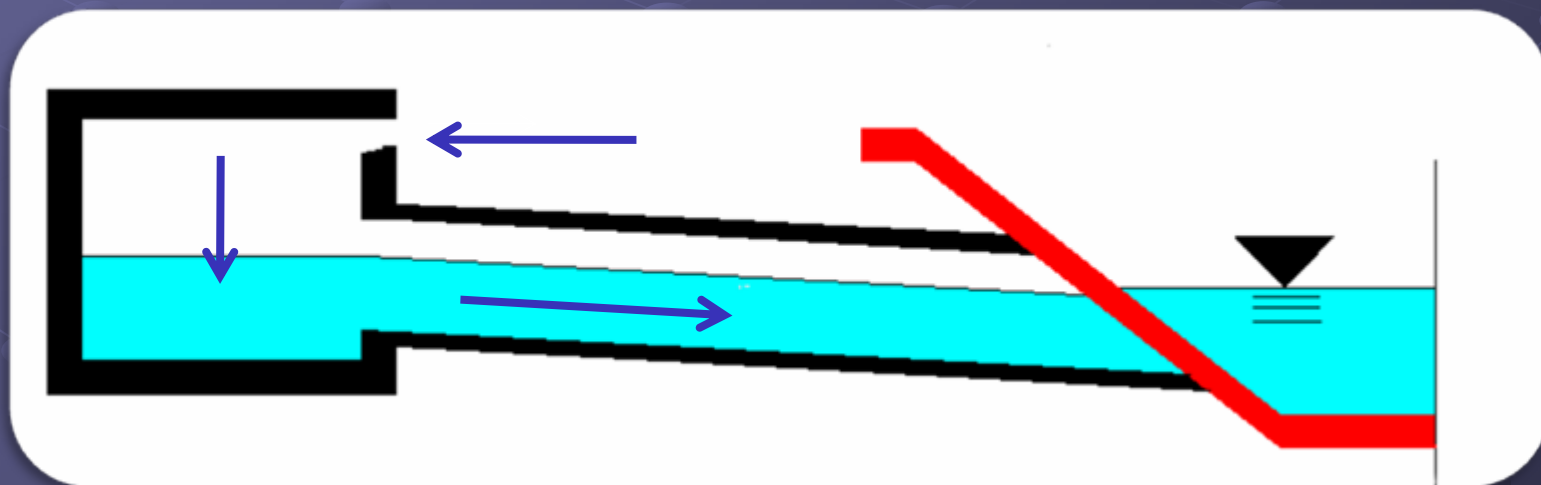
Curb and Gutter

● Advantages

- Common Design

● Disadvantages

- Mosquitoes
- Sediment
- Garbage
- Difficult to Clean



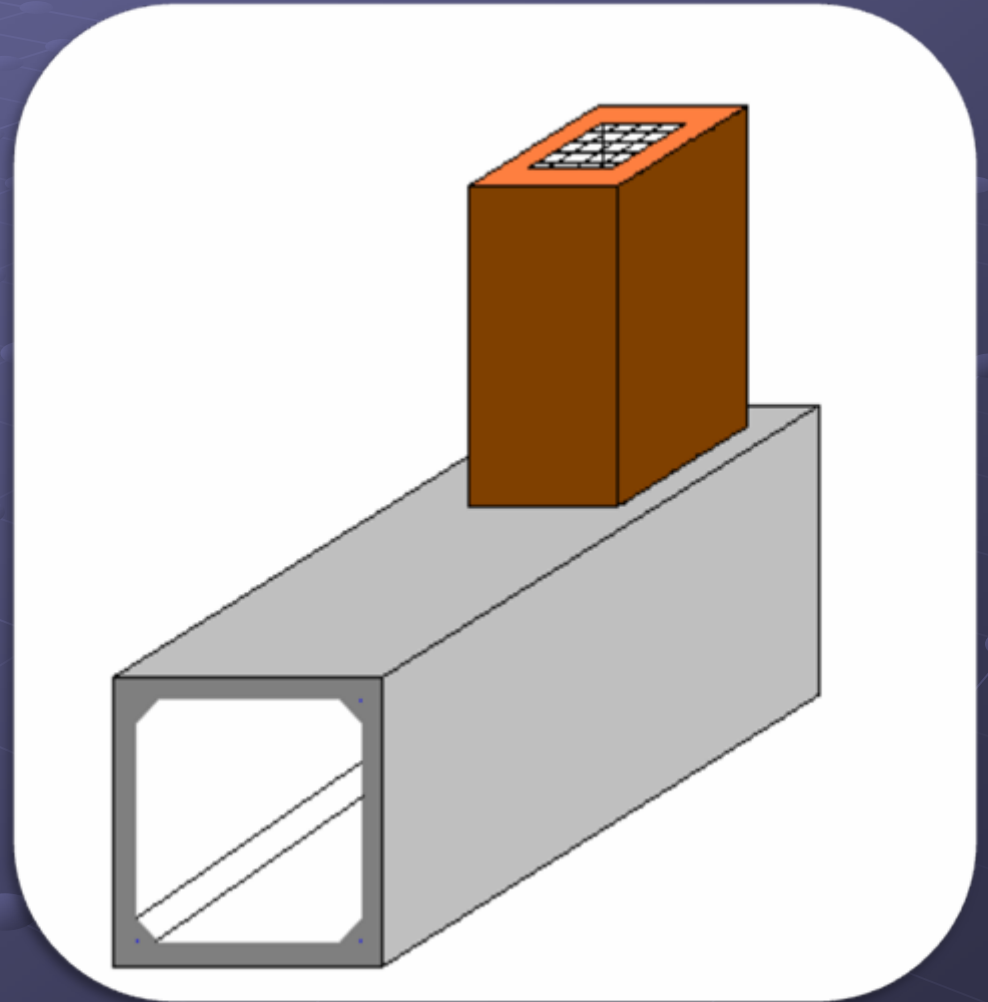
Box Culvert Design

● Advantages

- Grate limits debris
- Simple Design
- Easily cleaned
- Grate is a large inlet

● Disadvantages

- Sediment could enter the system



Curb Inlets

● Advantages

- Simple Design
- Easily Maintained
- Large water flow
- Common Design

● Disadvantages

- Sediment & Debris in system



Flooding Areas



Final Recommendations

Pave Flamingo Avenue

- **Cost - \$121,200 USD**

Rehabilitate 5th Ring Canal

- **Cost - \$18,200 USD**

Install curb inlet along 5th Ring Canal

- **Cost - \$1200 USD**

Use excess cut to fill areas B and C





PROJECT BENEFITS



Conclusion

- Appropriate sustainable solution
- Easily maintained
- Alleviated storm water flooding
- Improved transportation
- Reduced health risks

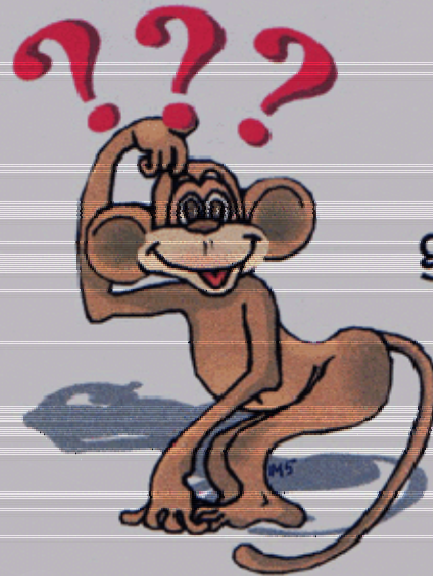


THANK YOU!!!

Linda Phillips
Dennis Magolan
Marilyn Phillips
ISD Mentors
Other ISD students
Our friends & family



We couldn't have done it without you!



Questions
are
guaranteed in
life;
Answers
aren't.