



# **IPRO 307**

## **Intermodal Solutions**

William Cabrera

Nicole Dennis

Paul Skopek

# Presentation Outline

- Purpose / Objective
- Background
- Current Issues
- Research
- Proposed Solutions
- Challenges Faced By the Team
- Acknowledgements

# Purpose and Objective

- Improve the truck flow in and around an intermodal facility at Harvey, IL which is owned by Canadian National (CN).
- Create physical designs that utilized the network of highways surrounding the intermodal yard.

# Project Site

Current Entrance  
at 159<sup>th</sup>

- Located in Harvey, IL
- Near Interstates 57, 80, & 294
- Sponsor Mi-Jack Products Inc
- Mi-Jack creates products that increase efficiency of intermodal yard shipping containers



# Intermodal Yards

- The meeting point of trains and trucks
- Intermodal freight is the fastest growing segment of US freight industry.
- Most utilized way to transport shipments.
- Chicago area has 27 intermodal yards with 700 miles of loading and unloading tracks.



# The Issues

- Cause influx of truck traffic into surrounding area
- Intermodal freight is expected to double in 10 years
- Need to optimize performance with low cost and positive environmental benefits.



# Team Organization



- The Team: William Cabrera, Nicole Dennis, Cordell Jackson, Karolis Kozys, Thomas Montgomery, Vaiibhav Patel, Malar Rathakrishan, Ali Razeq, Richard Rokita, Jorge Reuda, Paul Skopek, and Cody Snyder

## Community Impact

- Researched large-scale impact project will have on surrounding region
- Presented understanding of zoning laws and environmental impact on community

## Yard Design

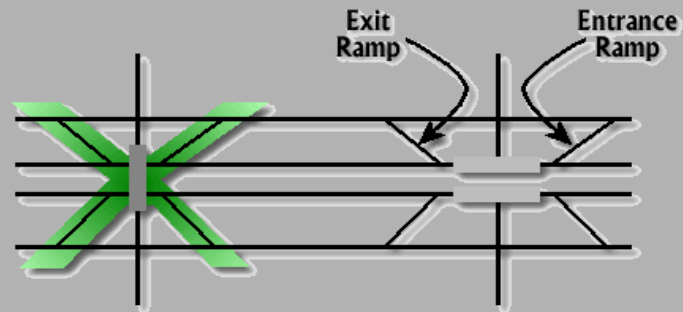
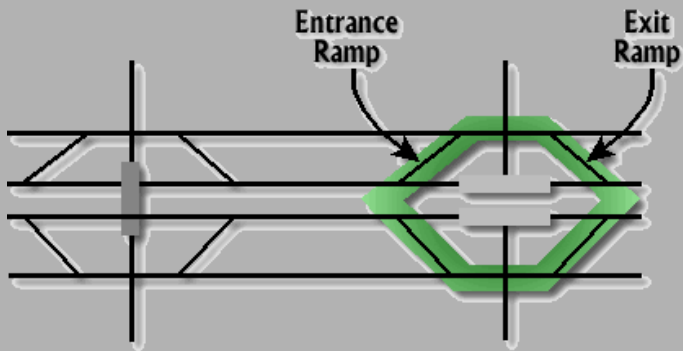
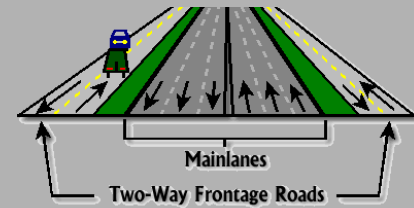
- Designed options for increasing accessibility to intermodal yard
- Created 3D walkthrough of project





# Frontage Roads

- Primarily used in Texas, sparse examples in Illinois
- Access road running parallel freeway, feeding into freeway at interchanges
- Increase efficiency of accessing
- Shown to greatly increase development of an area



# Environmental Impact

- Noise Regulations

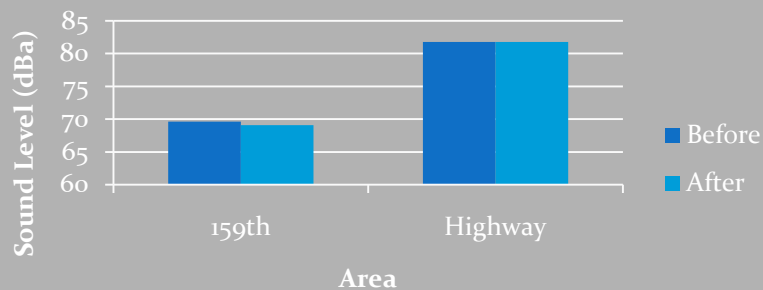
Category	Max noise level	Description
B	67 dBa	Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals.
C	72 dBa	Developed lands, properties, or activities not included in Categories A or B above.

- Land use regulations (Zoning)

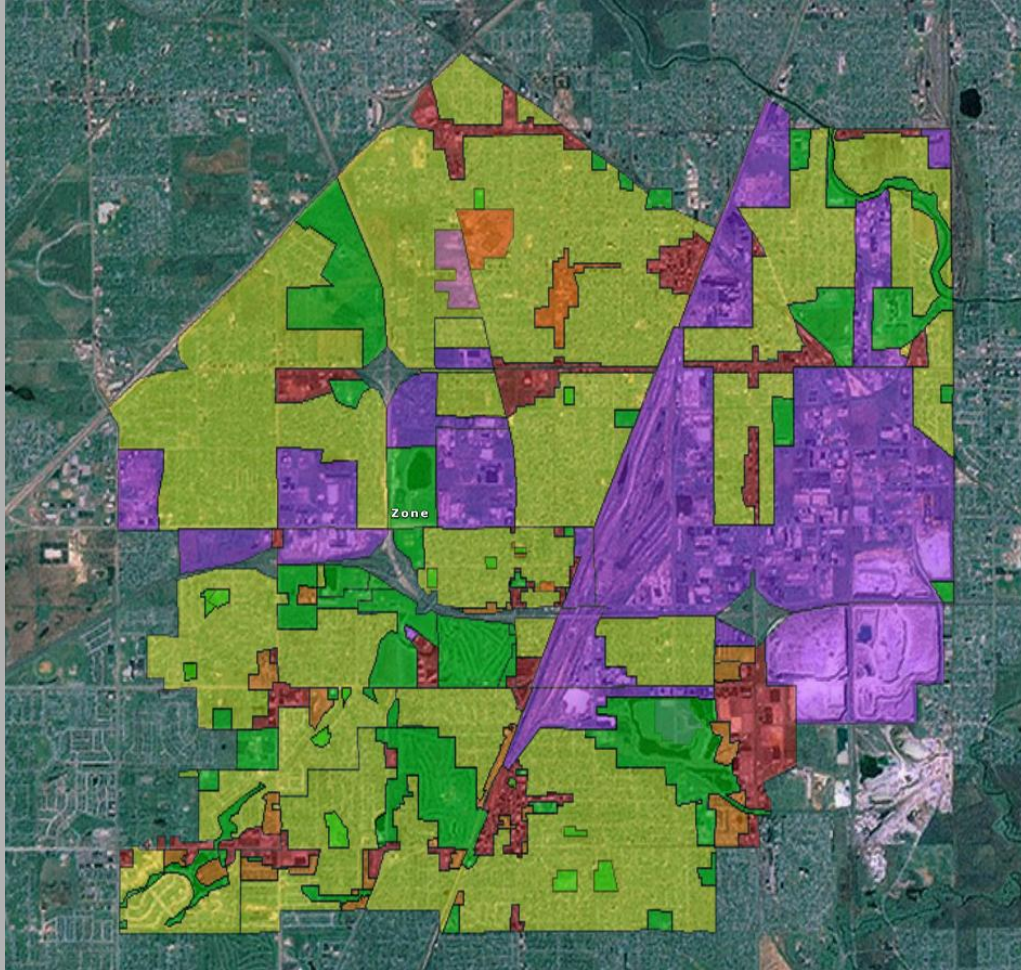
# Noise Level Analysis

- Noise levels were estimated using a simulation from the Federal Highway Administration.
- 159th St. and I-80 highway evaluated as they would be the most affected by the designs.
- Projected traffic values were used as data in the simulation.

Sound Levels Before/After Design Implementation



# Zoning



- Created to illustrate and analyze the different land use around the rail yard
- Yellow- single family residential
- Orange - multi family residential
- Red - indicates commercial
- Purple - industrial
- Green - parks and open spaces

# Ethics

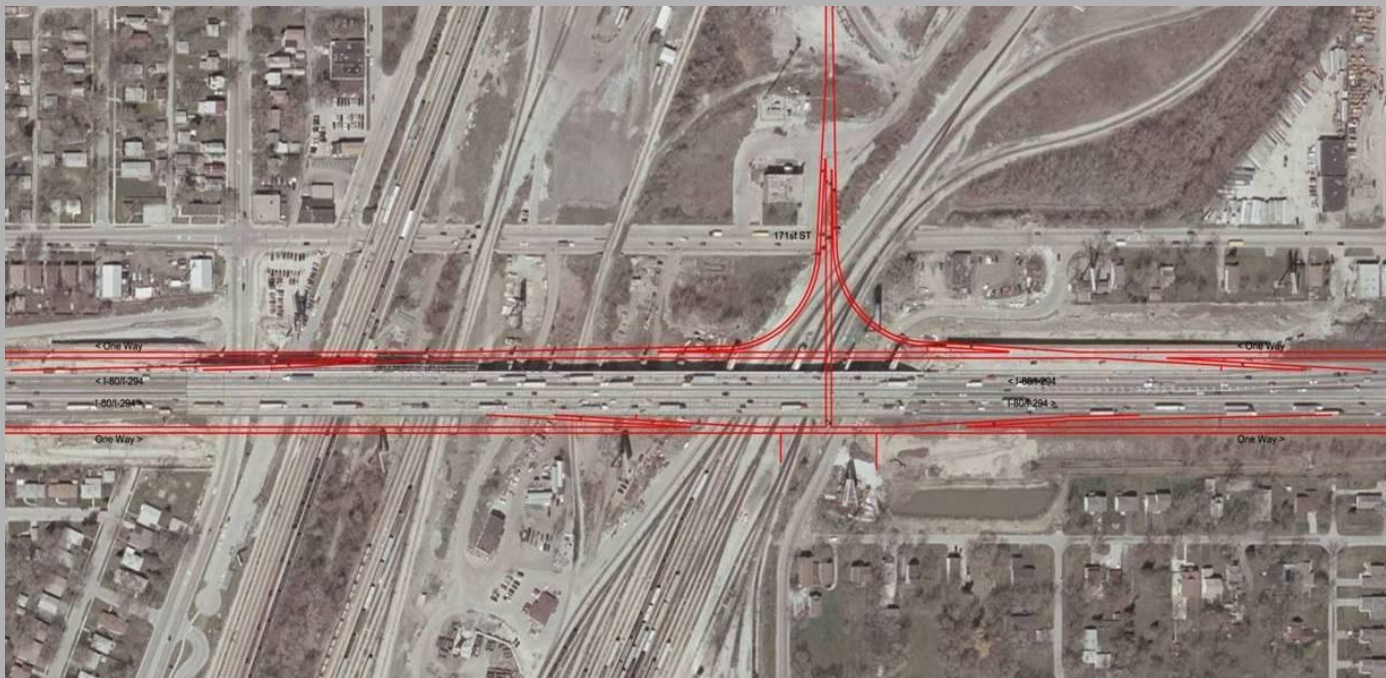
- Environmental Impact was a great concern
- Apparent Violations of Noise Requirements
- Residential buildings in an industrial zoned area



# Proposed Solution 1

## Option 1 - Two One Way Frontage Roads

- This option requires two frontage roads, one on each side of I-80. It would require a bridge that goes over I-80 to allow east-bound trucks to enter and leave the yard.



# Proposed Solution 2

## Option 2 - Frontage Road Utilizing Center Ave

- This option is to use the empty space on the north and south sides of I-80 just past the intermodal yard to put a set of exits and entrances onto Center Avenue.



# Proposed Solution 3

## Option 3 - Convert 171st Into a Two Way Frontage Road

- This option requires converting 171st into a two way frontage road using the existing ramps at Halsted Street.





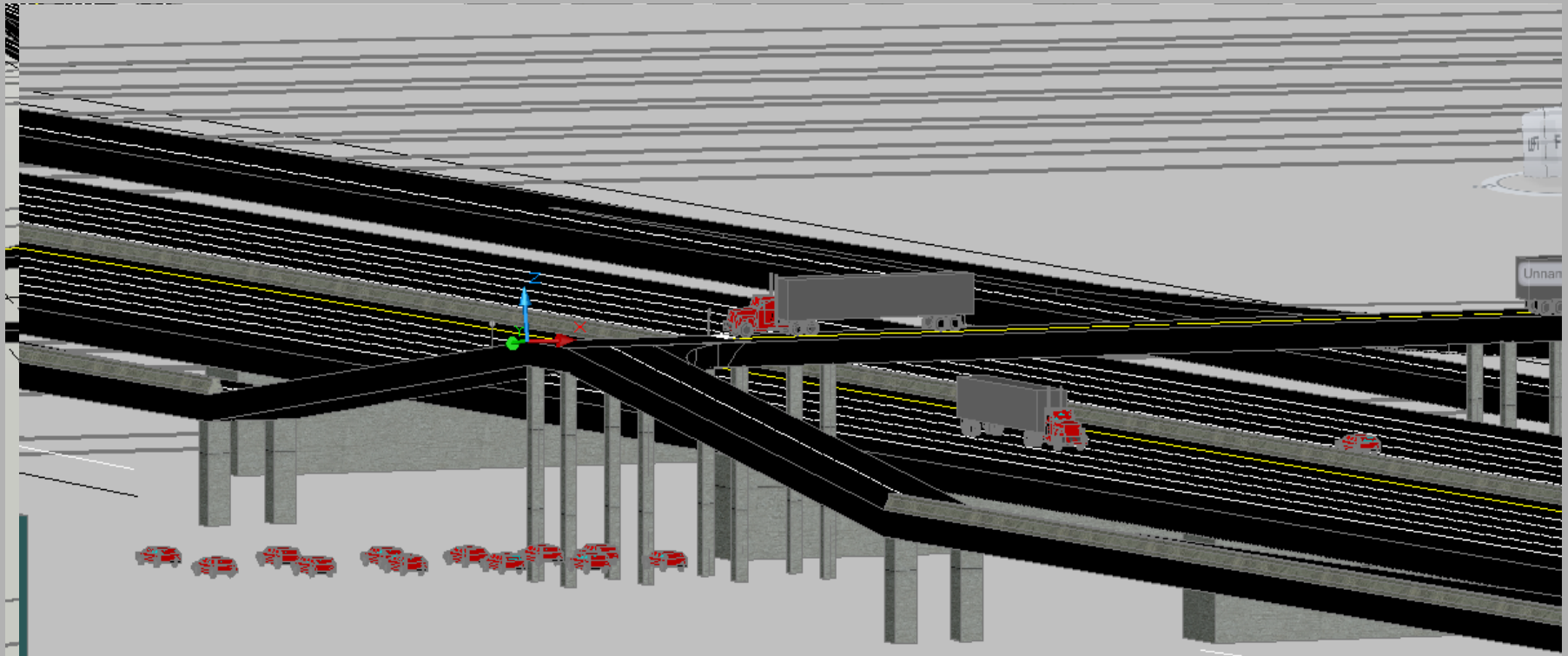
# Proposed Solution 4

## Option 4 - Ramp Directly Into Yard

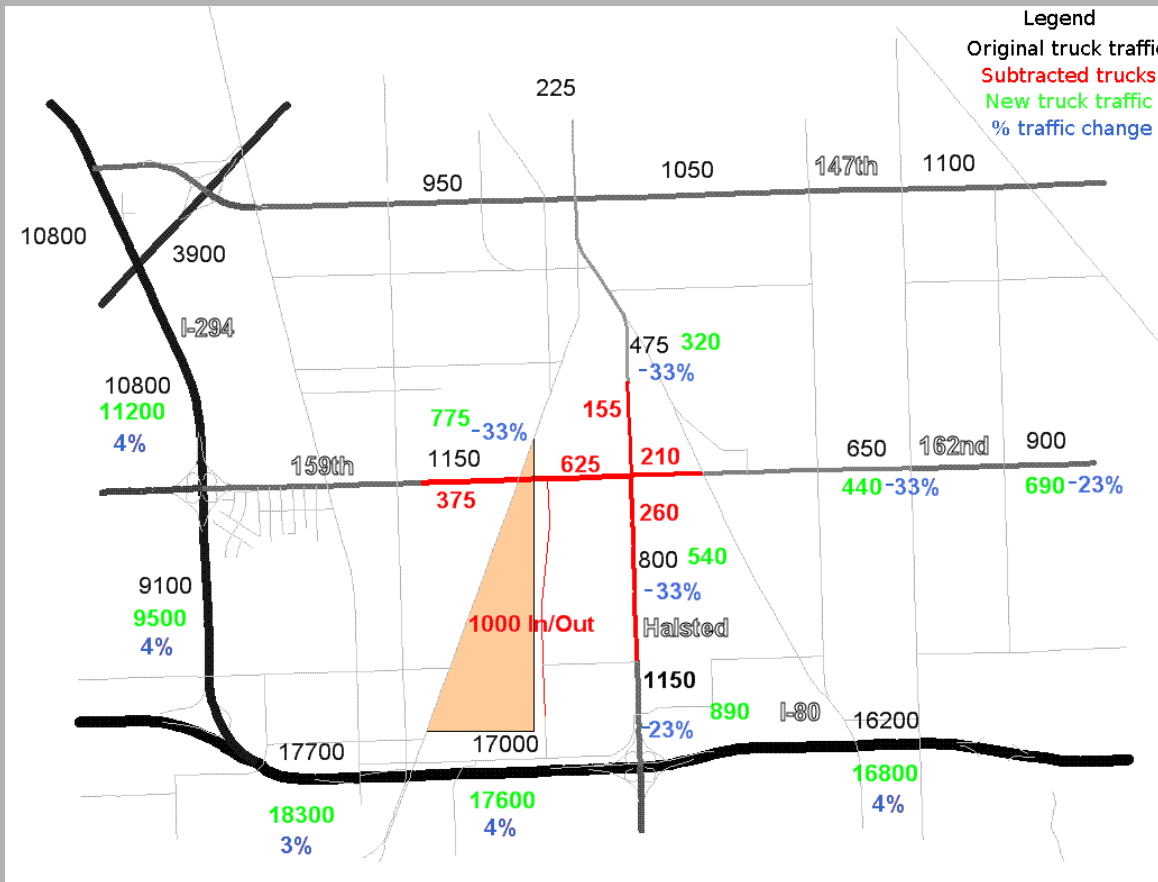
- This option is similar to option 1 but has no frontage roads. Unlike option 1 this option only requires space for the on/off ramps and the piers that go along with it.



# 3D Design Option 1



# Current And Projected Traffic



- Darker Lines: more traffic
- Black Numbers: total traffic
- Red Numbers: effect of ramp
- Green Numbers: change in traffic
- Blue Numbers: percentage change in traffic

# Challenges Faced

- Software Learning Curves
  - AutoCAD intensive project
  - GIS
- Work was in parallel rather than sequentially
  - Research conducted simultaneously
  - Working on ramp design and yard layout parallel to generating a walkthrough

# Acknowledgements

- Sponsor Mi-Jack Products, Inc
- Professor Rohter
- Peter Mirabella
- Professor Novak