PURPOSE AND OBJECTIVE

- This IPRO created four possible designs to improve the truck flow in and around Chicago’s National (CN) Intermodal Facility at Harvey, IL.
- A network of highways surrounds the intermodal yard, including interstates 294 and 80 which cross directly overhead. The designs focus on incorporating I-80/294 to allow trucks to directly flow into the yard and keep them off the local streets.
- The designs seek to optimize performance of the yard with minimal cost and positive environmental benefits.

CN’s ACQUISITION OF THE E&J Rail Lines

- Chicago is the world’s 3rd busiest intermodal hub, surpassed only by Hong Kong and Singapore. It can take a freight train longer to go from the North to the South side of Chicago (approx. 30 miles) than it does from Chicago to Winnipeg, Canada (approx. 860 miles).
- Chicago is a key rail hub, but congestion and infrastructure are currently major issues, CN rail lines converge in Chicago from five directions.
- CN’s acquisition of the E&J rail lines will reduce congestion in the Chicago-area rail yard by taking CN trains off lines that move through the city and moving them to a north-south arc around west Chicago.
- E&J operates over 198 main line miles of track encircling Chicago from Waukegan to Joliet to Gary, Indiana to South Chicago.

THE TEAM:

- YARD DESIGN
  - Design connections from highway and layout of the yard.
  - Create a 3D walkthrough of the bridge connection design.
  - Members: Cordell Jackson, Karolis Kozys, Malarva Rathakrishnan, Ali Razno, Richard Kokita, Paul Slopke, William Cabrera, Nicole Dennis, Thomas Montgomery, Vaiibhav Patel, Jorge Rueda, Cody Snyder

COMMUNITY IMPACT

- Research the impact of a large-scale project on the surrounding area.
- Understand zoning laws and environmental impact on the community.
- Members: Will Cabrera, Nicole Dennis, Thomas Montgomery, Vaiibhav Patel, Jorge Rueda, Cody Snyder

CURRENT AND PROJECTED TRAFFIC IMPACT STUDY

- Pictured above are average daily truck traffic numbers in the area surrounding the project site. This data was surveyed by Illinois Department of Traffic. Thinner and darker lines represent streets with more truck traffic. Black numbers are the total truck traffic collected at each sample point. Red numbers illustrate the estimated effect of the proposed off ramp design will have on traffic, taking in to consideration current traffic designated for the yard. The amount changed in traffic is in green and the percentage changed in traffic is in blue. The orange triangle represents the Harvey, IL Intermodal Yard.

Proposed Solutions:

Option 1 - Two One Way Frontage Roads
- This option requires two frontage roads, one on each side of I-80. The problem encountered with this option is that there is not enough room on the north side of the interstate for a frontage road. Also, there is limited space for on and off ramps onto these roads.

Option 2 - Frontage Road
- Utilizing Center Ave
- This option is to use the empty space on the north and south sides of the 294 just past the intermodal yard to put a set of exits and entrances onto Center Avenue. Heading westbound on the 294 trucks will use the exit at Halsted Street to an off ramp onto Center Ave. Trucks will travel north on Center to enter the Intermodal Yard. A westbound entrance ramp will be constructed from Center. Eastbound trucks will exit onto Center Ave and they will enter along the Halsted exit back onto the highway.

Option 3 - Convert 171 Frontage Road
- This option requires converting 171 into a two way frontage road. The problems this presents is that the road may need to be expanded. Also, this road passes under tunnels that would need to be expanded as well. Another issue is that of on/off ramps.

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. Because there is limited space in the area, this option may be the best fit for a ramp directly into the yard.

Research:

Frontage Roads

- Definition: Frontage roads are access roads running parallel to highways, which allow easy access to business, residences, and offices elsewhere.
- Common Names: Cruise control, expressway, limited-access, divided highway, “no exit”, “no service”, “no street” (new Mexico), super high-speed (Spain), “ring road” (Italy), “ring road” (France and Italy).
- Background: Frontage roads are often built as part of a multi-phase plan to construct new limited access highways. Initially they serve as a highway with access to local business, homes, and offices elsewhere. As the new highway opens, frontage roads serve as a major roadway for local activity. Speed limits on frontage roads generally range from 50 to 65 mph in urban areas to 60 mph in rural areas. They are used for both through traffic and access to property near the highway.
- Construction typically reduces the right-of-way cost, resulting in significant savings to overall cost of freeway development.
- Frontage roads can provide a means of handling large traffic flows, especially special traffic situations such as maintenance, accidents, and the movement of lane changes.
- One disadvantage is that more space is required, the greater the proximity to residences.

Lettis:

- Turnarounds: Turnarounds are open areas on a highway where vehicles can change direction or exit. Turnarounds can be used to provide access to commercial buildings or residential areas.
- Where to put turnarounds on highways: Turnarounds are typically placed at regular intervals along highways to provide access to commercial buildings or residential areas.

RN: Champion:

- Category Max noise level Description
  - B: 87 dBa Noise areas, recreation areas, schools, residential buildings, hospitals, health care facilities
  - C: 72 dBa Development, property, and agricultural land not included in Category B

Sound Level Before/After Design Implementation

- Image showing dBa range with the highway as a source. Red area is dBa>72. Blue area is less than 72 dBa.

In order to make sure that any of the options would not violate noise laws, noise levels were estimated using a simulation from the Federal Highway Administration. The above photo shows the frontage road system near Woodfield mall shopping area, in Schaumburg, IL. The picture in the upper right shows a close up of the “diamond” interchange.