



Gannett Fleming



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GIS Analysis Improve Train Noise Assessment

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Federal Approach

- Federal and TIGER program funds were available for high speed intercity passenger rail projects.
- Federal funding covers preliminary engineering and environmental review under National Environmental Policy Act (NEPA).



Federal Approach

- Tier I, Service-Level (or programmatic)
- A broader, less detailed NEPA review
- Intended to indicate the location and magnitude of potential/likely impacts and problems to help guide decisions.
- Not intended to be a rigorous review.

FTA/FRA Methodology

- FTA/FRA Noise and Vibration Impact Assessment Guideline is the reference used to address noise and vibration on rail projects for urban areas or large corridors
- Time consuming to complete a general noise assessment for long rail line.

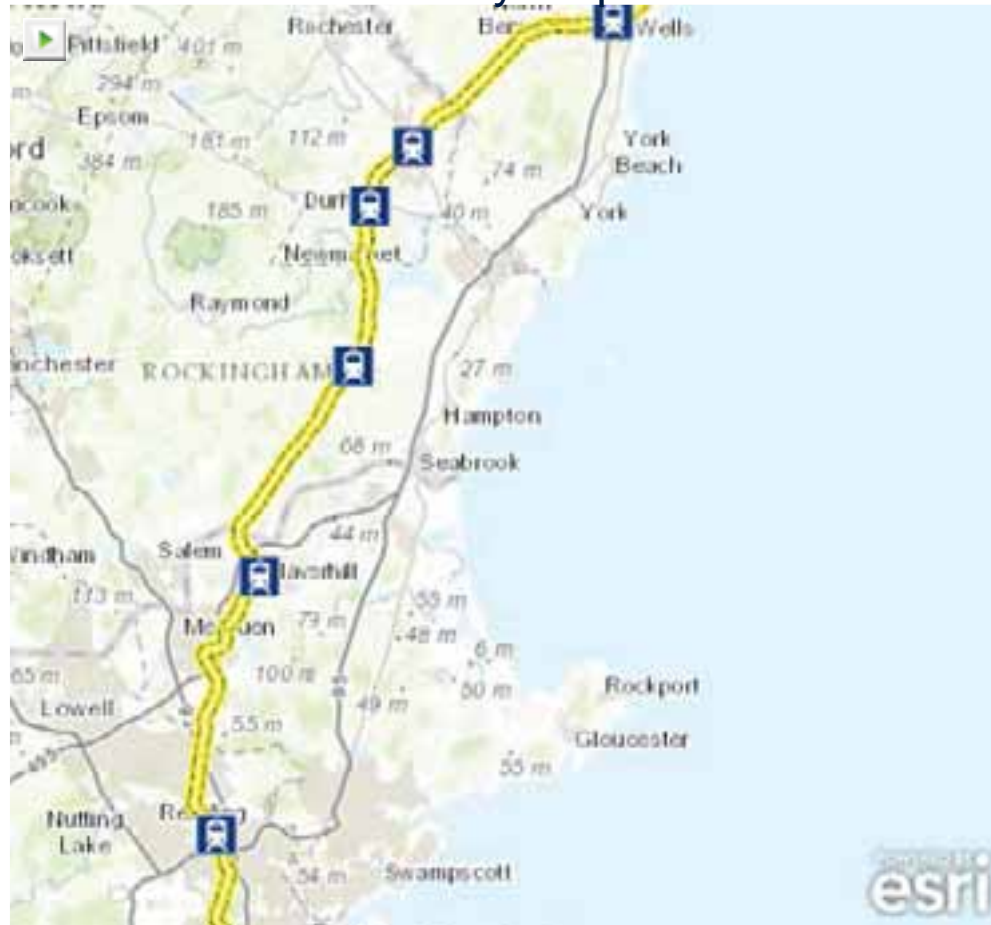
FTA/FRA Methodology

Several factors are considered in the analysis of a long railroad corridor:

1. rail traffic density and speed,
2. land use,
3. existing noise levels,
4. use of train horn.

A Tale of Two Projects

ArcGIS Online Story Map Placeholder



A Tale of Two Projects (Project A)

- Passenger Rail project from Portland to Brunswick, ME
- Approximately 30-mile corridor



A Tale of Two Projects (Project A)

- 4 trips during daytime and 2 trips nighttime
- Train speed varied between 30-60 mph
- Screening distance varies between 100 to 600 feet
- Quiet Zone vs. Train horn

Project A Analysis

- How to determine number of potential impacts?
- How to differentiate land uses (residences vs others)?
- How to account for variable screening distances?
- Use of aerial maps, manually counting units
- Very time consuming, How many weeks?? Any guess

Project A Analysis Shortfalls

- Time intensive impacts (weeks, not days)
- Manual process for proximity analysis
- Potentially inaccurate calculations due to manual process
- Existing Freight train activity (8 trains)...redo analysis?
- **GIS is the solution!**

Project A Results

- Ambient/baseline sound level identified
- Identifying potential impacts.....2 weeks
- Redrawing buffer distances on aerial maps...1 week
- medium impacts: 83 and no severe impact
- What happens if corridor is longer.....???

A Tale of Two Projects (Project B)

- Passenger Rail project from Boston, MA to Brunswick, ME
- Approximately 150 mile corridor!



A Tale of Two Projects (Project B)

- 12 trips during daytime and 2 trips nighttime
- Train speed varied between 30-80 mph
- Screening distance varies between 200 to 1,320 feet
- Quiet Zone vs. Train horn

New Approach for Project B

- Summarize rail traffic in the project corridor.
- Divide the corridor into rail segments with unique traffic volume or speed.
- Buffer distances generated by attribute in GIS
- Identify land use using existing GIS data layers (building footprints, community facilities, and latest demographic data, aerial photography)

GIS Analysis (Project B)

- Develop noise contours based on existing topographic data
- Building footprints converted to centroids and identified as residential using existing land use
- Summarize number of impacts within the contours for each Noise Condition



Project B Results

- Identifying potential impacts.....< 2 days
- Redrawing buffer distances on aerial maps < 1 week
- Potential noise impacts: 1,700 MA, 1,100 NH, 2,100 ME
- Potential vibration impacts: 1,028 MA, 343 NH, 877 ME
- **COST Savings is more than 50%**