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Enhancing Public Involvement with Four-Dimensional Modeling

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Presentation Outline

- Center for Transportation Research
- Case Studies
  - Loop 12 and State Highway 114
  - Woodall Rodgers (Spur 366) Deck Park
  - IH30 and Bush Turnpike Interchange
- Other Options
- Benefits and Limitations of Visualization

Center for Transportation Research (CTR)

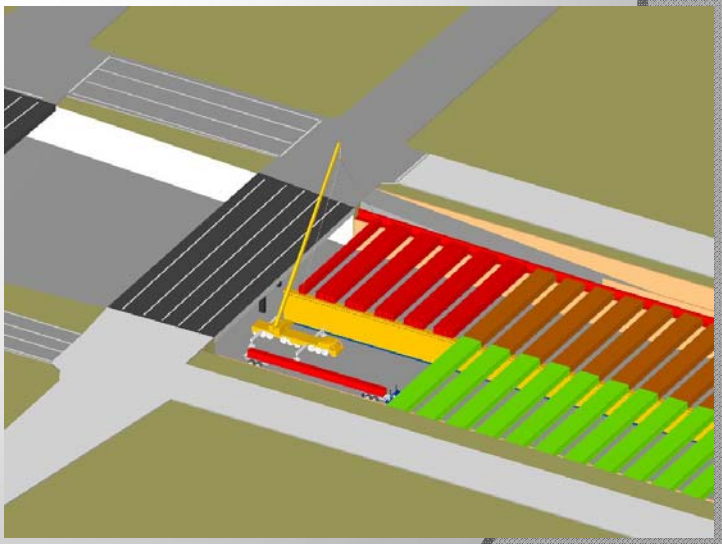
- Nabeel Khwaja, P.E.
- William O'Brien, Ph.D., P.E.
- Cameron Schmeits
- Jean Goyat
- Kristopher Pruner

Software

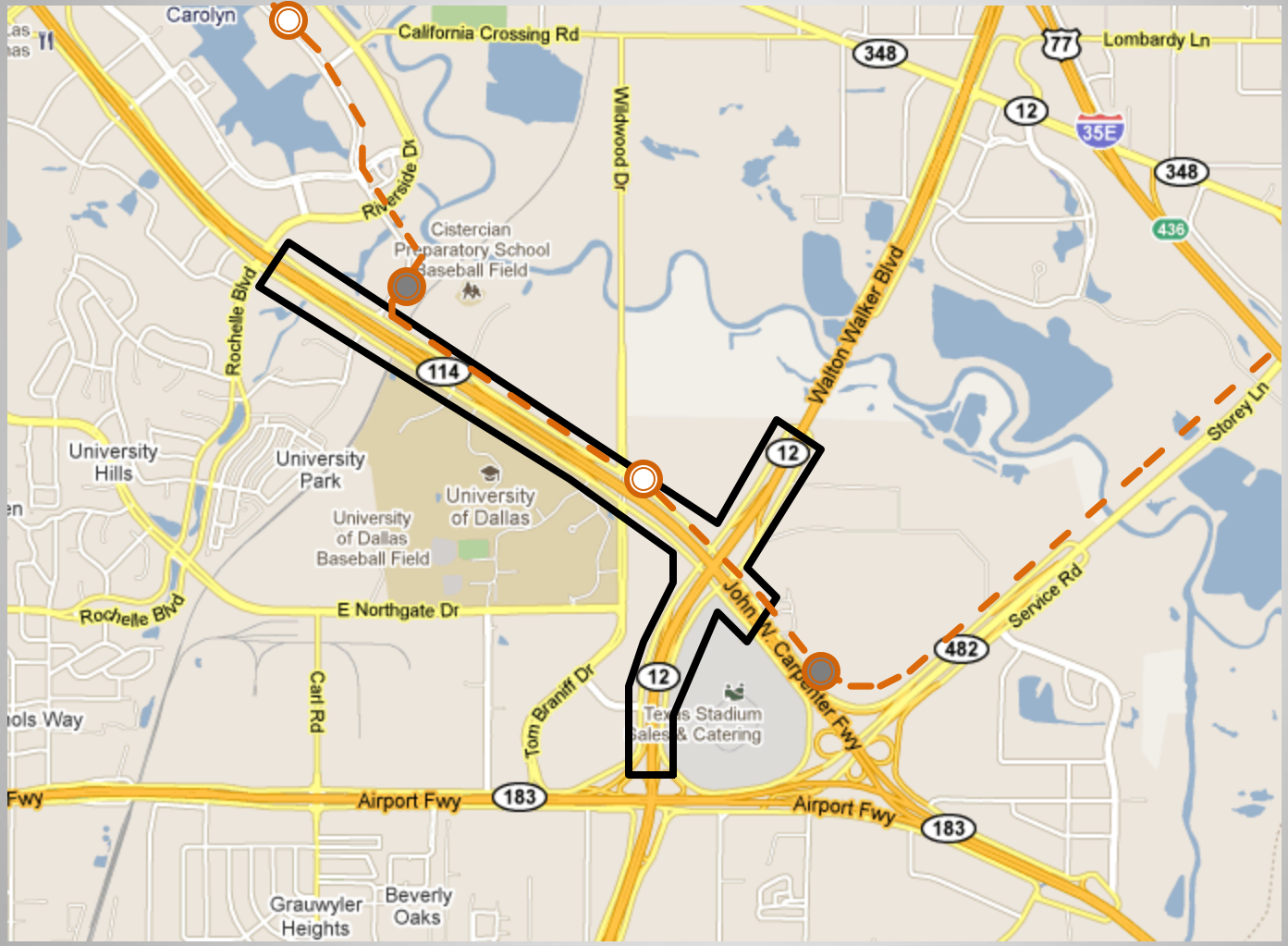
- Autodesk Navisworks
  - Combines construction schedules (P3, P6, etc.) with 3D AutoCAD models
  - Allows for visualization of construction sequencing
  - Easy updating (provided schedule activities have not changed significantly)

Case Studies

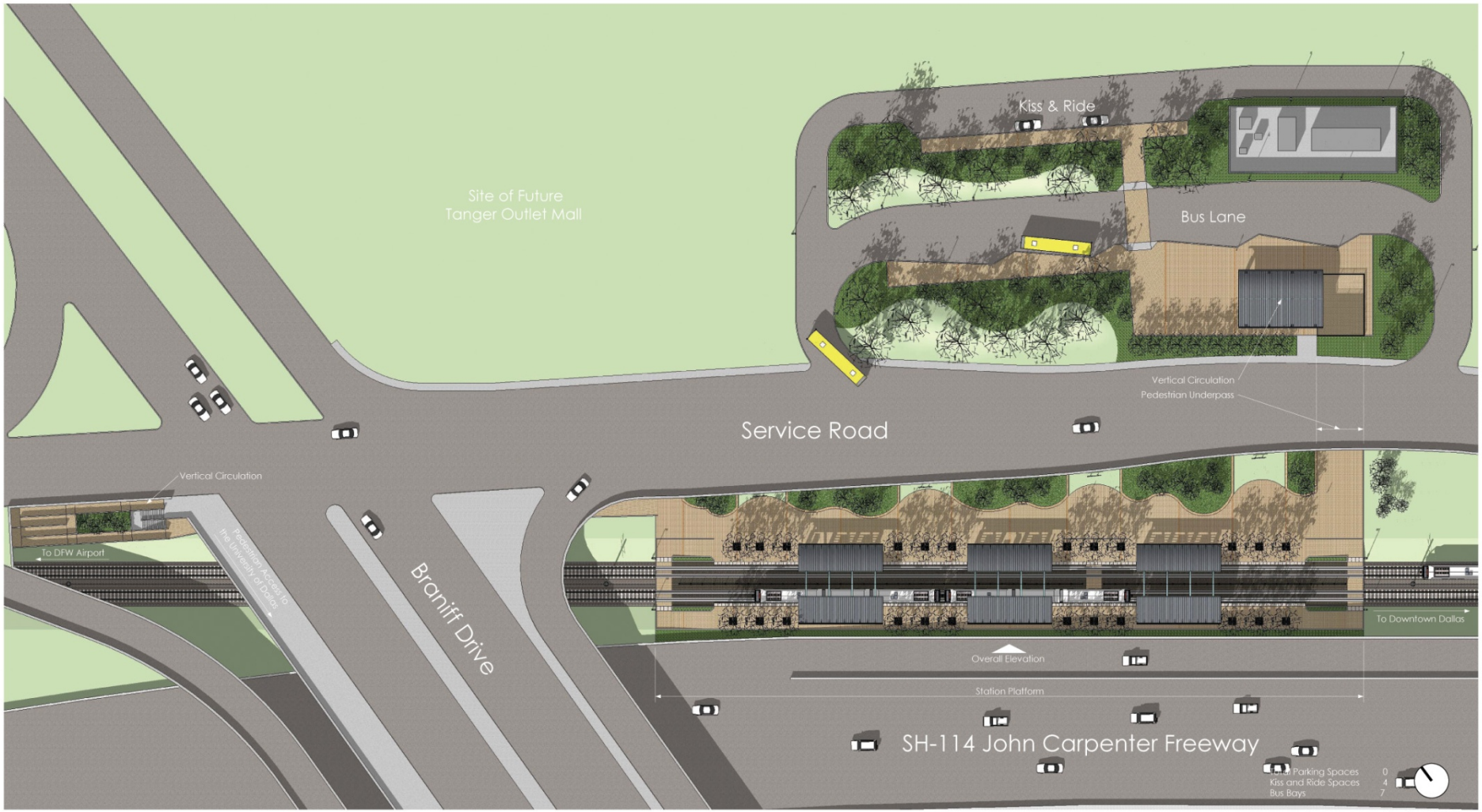
- Loop 12 and State Highway 114
- Woodall Rodgers (Spur 366) Deck Park
- IH 30 Interchange with President George Bush Turnpike (Eastern Extension)



Loop 12 at SH 114



Loop 12 at SH 114



Scale: 1"=30'-0"

Site Plan

Lyle Novinski - Station Artist

Line Section I-1

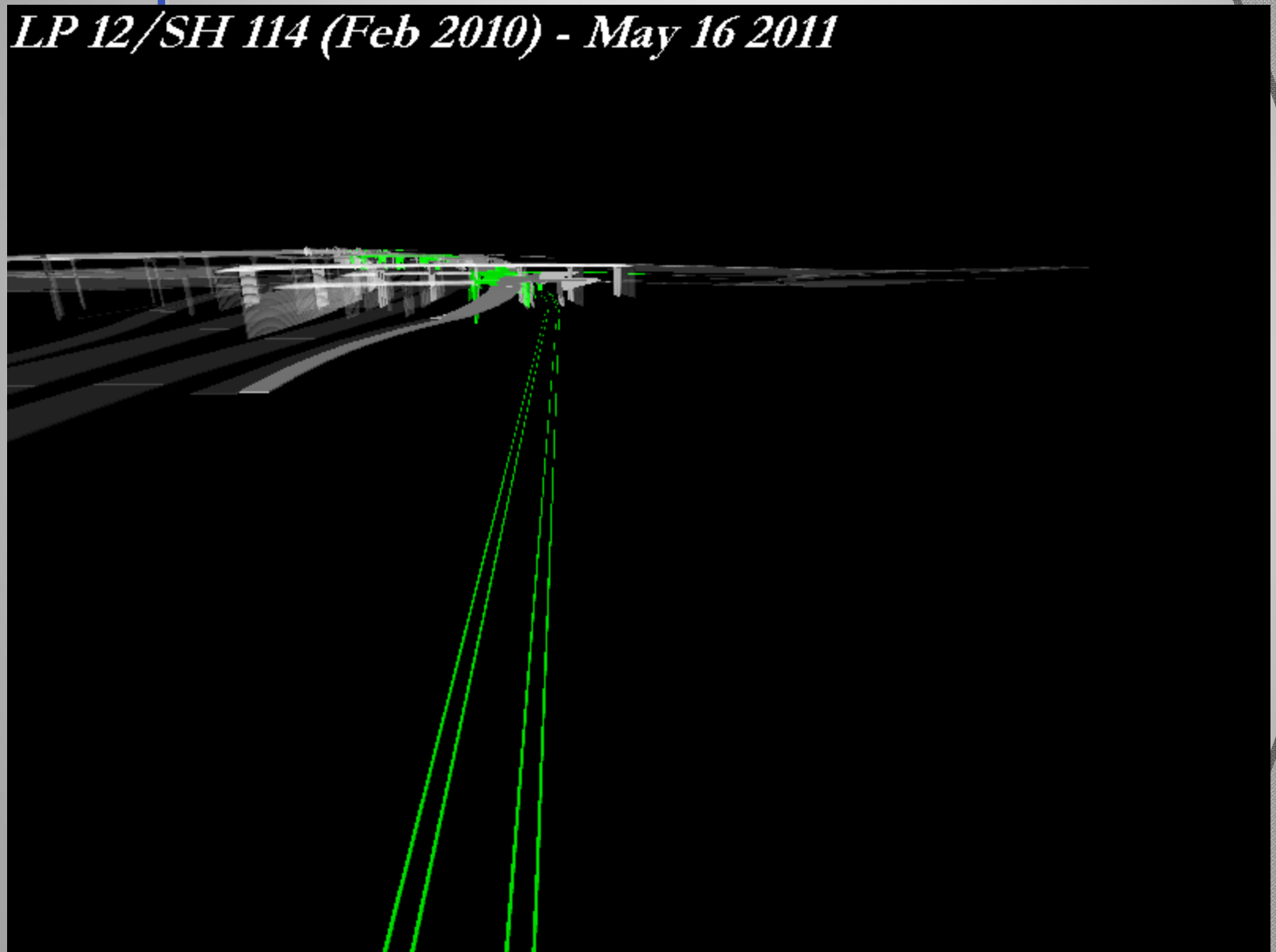
University of Dallas Station

Loop 12 at SH 114

- Model developed to address concerns regarding transit agency's contractor working within the same general area as TxDOT's contractor
- Model simplified task of explaining to non-technical audiences the complexity of constructing light rail in TxDOT right-of-way, especially during roadway construction
  - Regional Transportation Council
  - Irving-Las Colinas Chamber of Commerce

Loop 12 at SH 114

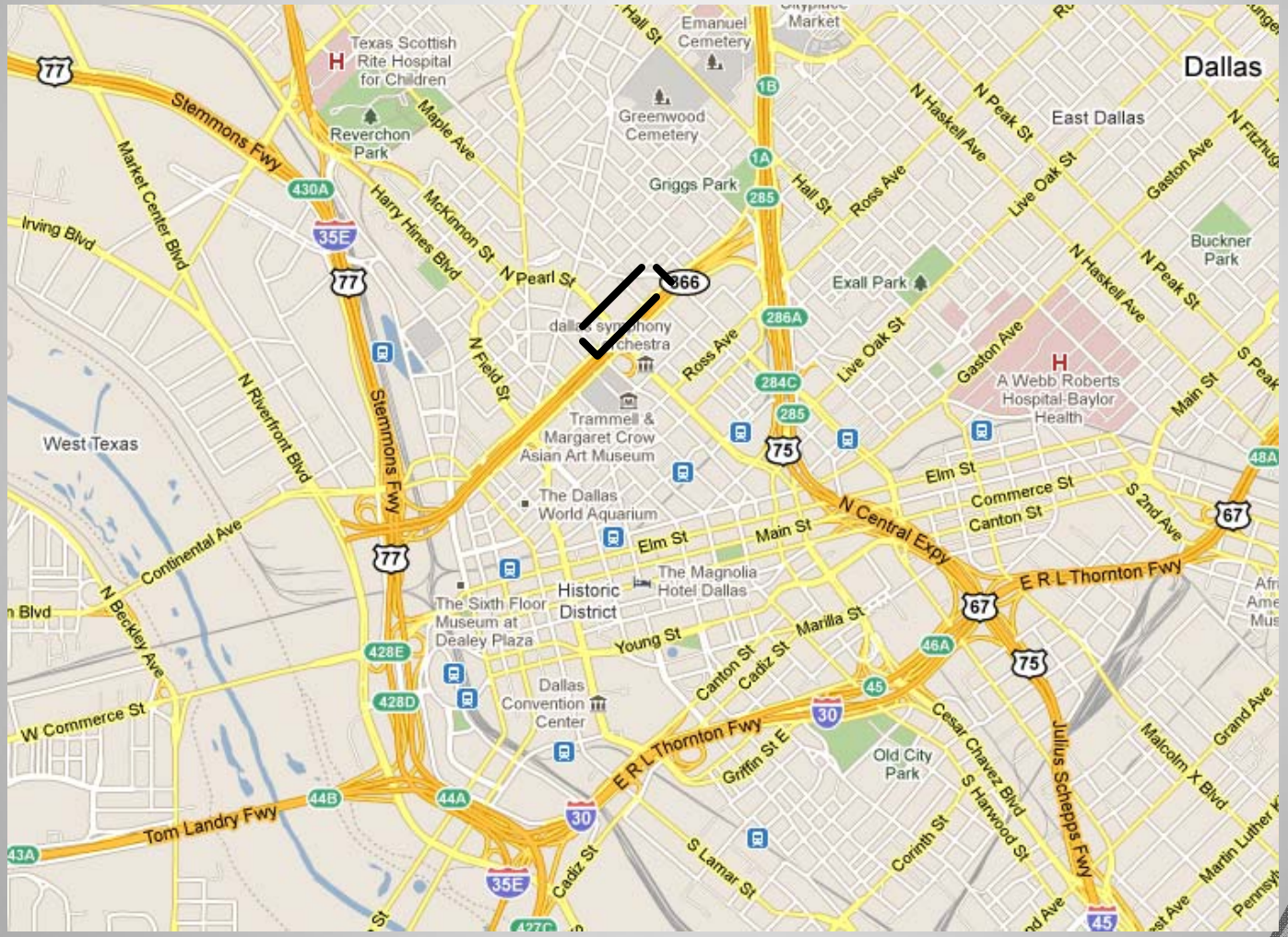
Loop 12 at SH 114



Loop 12 at SH 114

- Benefits
  - Ability to identify construction conflicts as schedule slipped due to utility relocation issues
  - Ability to communicate with regional leaders regarding positive impacts of an acceleration program
    - DART construction would otherwise be significantly delayed

Woodall Rodgers Freeway Deck Park



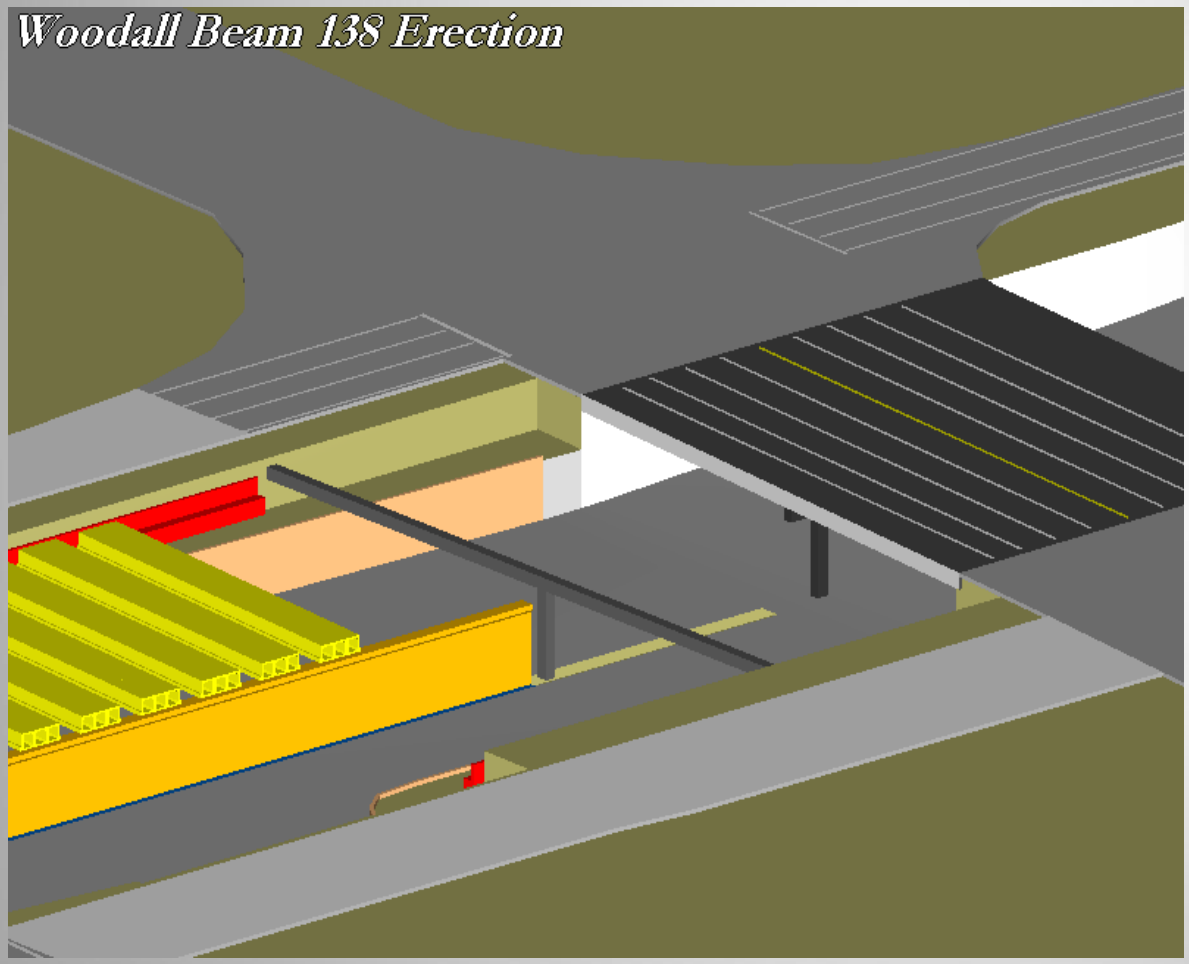
Woodall Rodgers Freeway Deck Park

- Dallas, TX (Downtown)
- Freeway (Spur 366) provides access to downtown and links major freeway corridors
  - US 75/I-345/I-45
  - I-35E
- Build a 5.2 acre park over existing freeway
  - Better links downtown arts district with Uptown (a dense residential and commercial area)
- Only limited interruptions to traffic permitted

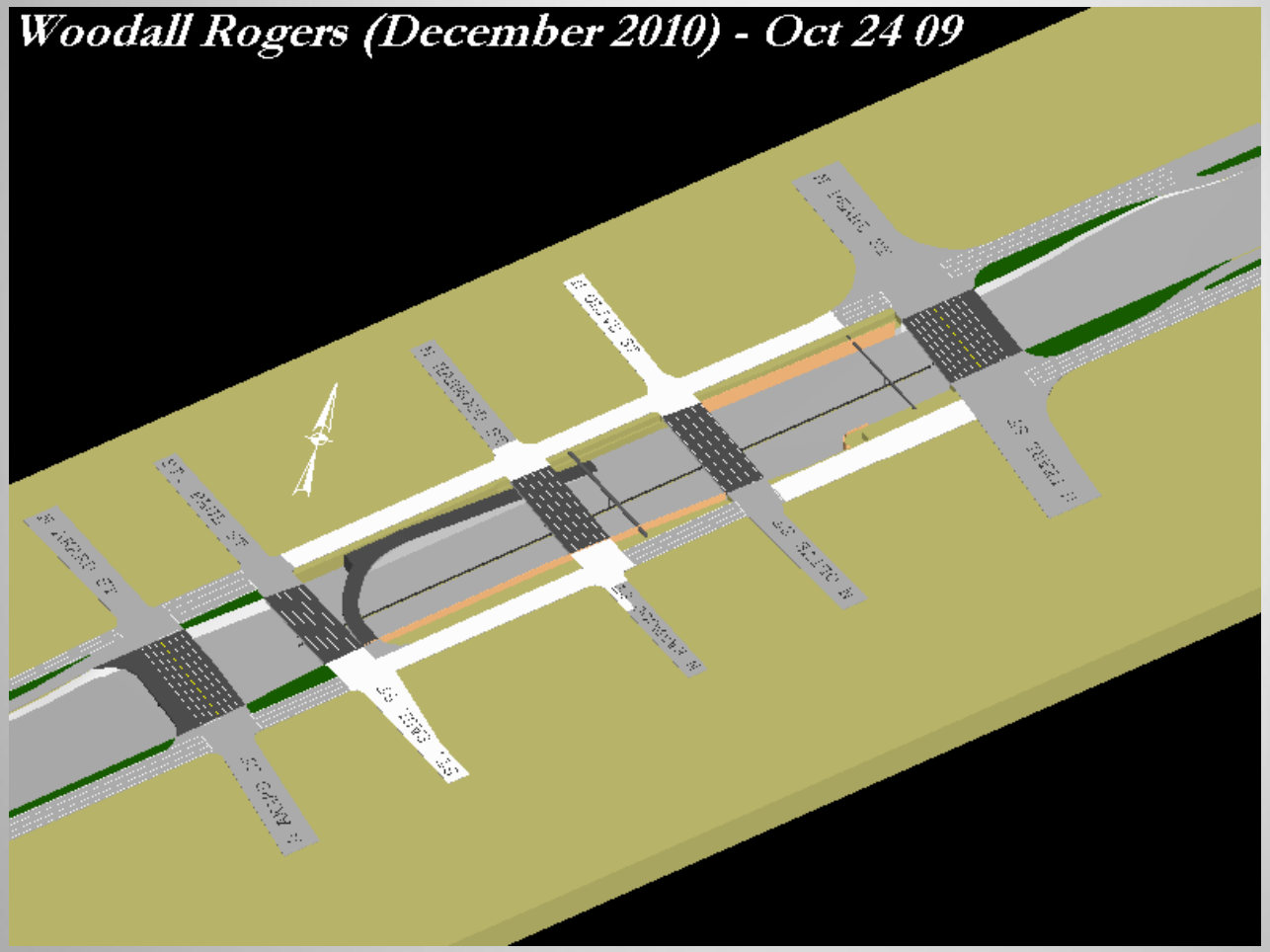
Woodall Rodgers Freeway Deck Park

- Model developed due to concerns regarding limited work areas
  - Active, depressed freeway section, alongside Downtown Dallas
- Model useful for checking beam placement activity feasibility and reviewing sequencing with project staff
- Model also allowed for visual checks on productivity of construction operations

Woodall Rodgers Freeway Deck Park



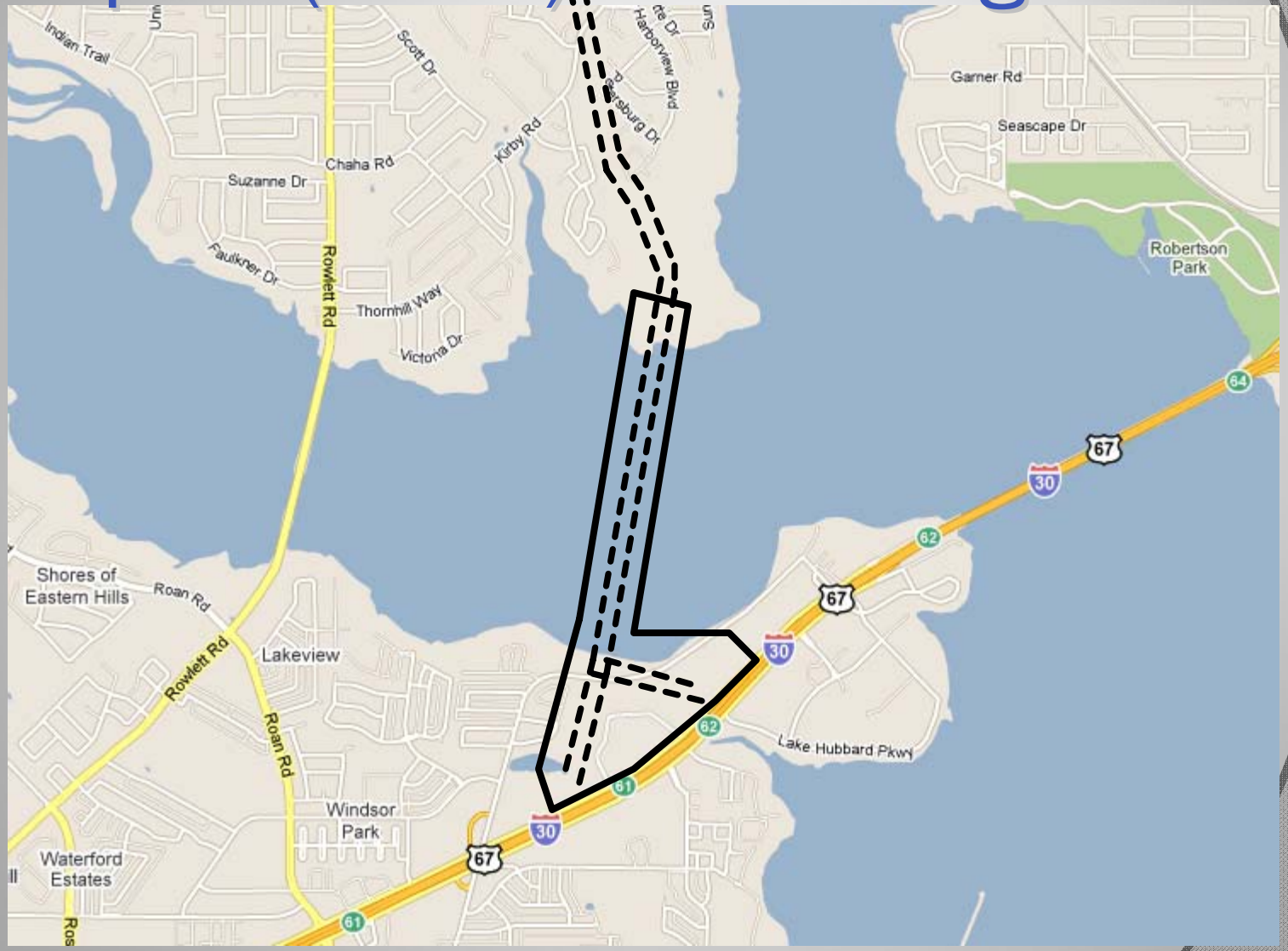
Woodall Rodgers Freeway Deck Park



Woodall Rodgers Freeway Deck Park

- Benefits
  - Identify potential construction conflicts in advance
  - Model potential beam placement scenarios in advance
    - Check clearances
    - Check feasibility of beam sequencing

I-30/President George Bush Turnpike (PGBT) Interchange



I-30/President George Bush Turnpike (PGBT) Interchange

- Garland, TX
- Build bridge across Lake Ray Hubbard to carry President George Bush Turnpike (Eastern Extension)
- Construct interchange between PGBT and IH 30
- Enhances mobility through much of PGBT corridor
- Target for interchange opening date
  - Related to bonds used to fund project by NTTA

I-30/President George Bush Turnpike (PGBT) Interchange

I-30/President George Bush Turnpike (PGBT) Interchange

- Most detailed of the models
  - Individual elements modeled separately
- Allowed for in-depth viewing of sequencing and identification of construction conflicts
  - Helped identify conflicts between sub-surface utility conduits and a retaining wall
  - Model the sequence of construction and the ROW acquisition process that was still in progress

Other Options

- Full design visualization models
  - Well received
  - Costly, time consuming
  - Not easily updated
- LBJ Express lane closures
  - Quick turn
  - Visual is often better for the media
- US 75 at Parker Road single-point urban interchange (SPUI)
  - Slightly different modeling
  - Not schedule program-based
  - Unveiled at press event to demonstrate how the SPUI will operate

Lessons Learned

- Simplifies job of explaining project to non-technical audiences
- Provides a quicker, simpler and visual method of checking construction schedules
- Allows for checking of conflicts in advance and review of construction sequencing
- Once the initial model has been developed it can be “progressively elaborated” depending on needs
- Developing a detailed object-oriented model requires significant lead time
  - Scale the effort to meet the needs

Questions?