


# Virginia Concrete Conference


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## Pinners Point Interchange Project


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### Life Of The Pinners Point Interchange Project

- Design Contract Signed
  - » October 28, 1991
- Projected Construction Completion
  - » June 30, 2005

### Begin Project




### Begin Project



### End Project



### Project Location



## Project Location



## Need for the Project

- To Provide Additional Capacity To The Midtown Tunnel
- To Provide A Direct Connection Via An Interchange Between The Western Freeway, The Midtown Tunnel And Martin Luther King Freeway
- To Remove Transient Western Freeway Traffic From Residential Streets In Historic Port Norfolk
- To Help Alleviate Traffic On The Other River Crossings

## Historic Port Norfolk



## Historic Port Norfolk



## Milestone Dates

- Plan Originated In 1965 Southeastern Regional Transportation Study
- Location And Preliminary Design Study – January 1990
- Design Contract Signed – October 28, 1991

## Construction Contract Awarded On

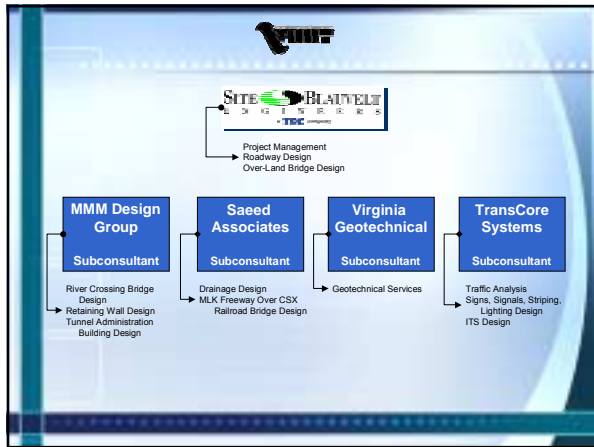
**November 15, 2001**

**Tidewater Skanska, Inc.  
\$136,000,000**

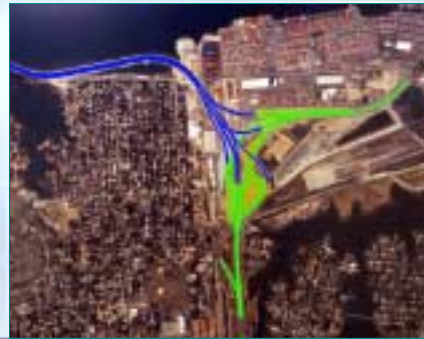
## Ground Breaking Ceremony



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## Components of Project



## MLK Freeway Over CSX Railroad



## MLK Freeway Over CSX Railroad



### MLK Freeway Over CSX Railroad



### MLK Freeway Over CSX Railroad



### MLK Freeway Over CSX Railroad



### MLK Freeway Over CSX



### Overland Bridges



Alignments

### Geometric Constraints

- Portsmouth Marine Terminal
- Titan America (Tarmac)
- Norfolk Portsmouth Beltline Railroad



Portsmouth Marine Terminal



Portsmouth Marine Terminal



Portsmouth Marine Terminal



Portsmouth Marine Terminal



Titan America



Titan America



### Norfolk Portsmouth Beltline Railroad



### Complex Geometry

- Number of Horizontal Curves 12
- Number of Piers 62
- Number of Spans 62
- Number of Cont. Units 18
- Number of Abutments 6

### Complex Geometry



### Complex Geometry



### Complex Geometry



### Complex Geometry



### Why Drilled Shafts?

- Smaller Foundation Footprint
- Higher Capacity per Element
- Minimize Vibrations on Existing Facilities
- Economy of Scale

### Test Shafts



### Drilled Shafts



### Foundations

- 42"  $\Phi$  Drilled Shafts
- 60"  $\Phi$  Drilled Shafts
- 72"  $\Phi$  Drilled Shafts
- 84"  $\Phi$  Drilled Shafts

### Drilled Shafts



### Piers

- Multi-Column
- Hammerhead
- Post-Tensioned Pier Cap

### Pier Types



### Land of Many Columns



### Multi-Column Piers



### Hammerhead Piers



### Post-Tensioned Pier Cap



### Post-Tensioned Pier Cap





Post-Tensioned Pier Caps



Post-Tensioned Pier Caps



Post-Tensioned Pier Caps



Post-Tensioned Pier Caps

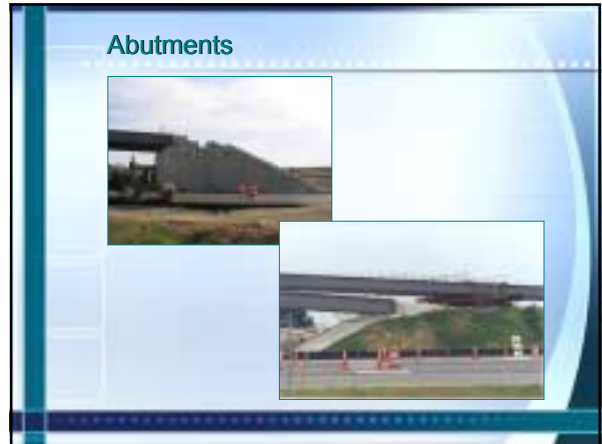


Post-Tensioned Pier Caps



Abutments





### Miscellaneous – Inspection Station



### Miscellaneous – Temporary Traffic Control



### Miscellaneous – Impact Attenuators



### Concrete *Factoids*

- Low Permeability Concrete

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- Compressive Strengths

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- Low Permeability Concrete
- Compressive Strengths
- Volumes
- Post-Tensioning Grout

### Pinners Point Interchange



### Transition from Overland Bridge to River Crossing



Billy R. Jenkins, P.E.

**MMM** DESIGN GROUP  
ARCHITECTS+ENGINEERS+PLANNERS

### GEOMETRICS

- Connects Interchange Bridges to Existing West Norfolk Bridge
- Length
  - ✓ Main Bridge (3600 LF)
  - ✓ EB Bikeway (563 LF)
  - ✓ WB Bikeway (640 LF)
- Width Varies from 60 to 114 Feet
- Height Varies from 25 to 40 Feet
- Spans Vary from 50 to 130 Feet
- Vertical Curve
- Horizontal Curve
- Spiral Taper in Transitions
- Varying Superelevations
- Pile Bents are "Radial"

### River Crossing Bridge



#### "Concrete Facts"

- P/C P/S Concrete Piles
- CIP Concrete Bent Cap
- P/C P/S Concrete I-Beams
- CIP Concrete Deck
- CIP Concrete Parapets & Median Barriers



### P/C P/S Concrete Piles

- 66" Diameter Cylinder Piles
  - ✓ Capacity: 300 to 500 T
  - ✓ Concrete: 7 KSI
  - ✓ Quantity: 33,995 LF (6.5 Miles)
- 24" Square Piles
  - ✓ Capacity: 100 T
  - ✓ Concrete: 5 KSI
  - ✓ Quantity: 11,135 LF (2.1 Miles)
- 12" Square Piles
  - ✓ Capacity: 40 T
  - ✓ Concrete: 5 KSI
  - ✓ Quantity: 755 LF
- **Total Quantity: 45,885 LF (8.7 Miles)**


### CIP Concrete Bent Caps


- Concrete: 3 KSI Low Permeability
- Quantity: 6,236 CY



### P/C P/S Concrete I-Beams

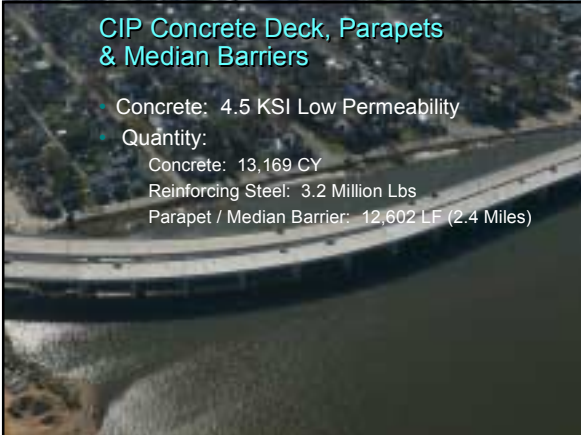
- Concrete: 8 KSI
- Quantities
  - Type II & III: 2,445 LF
  - Type V : 38,730 LF (7.4 Miles)
  - Type VIM : 16,640 LF (3.2 Miles)
- **Total Quantity: 57,815 LF (11 Miles)**





### CIP Concrete Deck, Parapets & Median Barriers

- Concrete: 4.5 KSI Low Permeability
- Quantity:
  - Concrete: 13,169 CY
  - Reinforcing Steel: 3.2 Million Lbs
  - Parapet / Median Barrier: 12,602 LF (2.4 Miles)







### River Crossing Bridge

#### "Concrete Facts"

- P/C P/S Concrete Piles (8.7 Miles)
- CIP Concrete Bent Cap (6,236 CY)
- P/C P/S Concrete I-Beams (11 Miles)
- CIP Concrete Deck (13,169 CY)
- CIP Concrete Parapets & Median Barrier (2.4 Miles)

### Utilities

- Water Main
- Power
- Lighting
- Telephone (Verizon)
- Cable (Cox Communications)
- Traffic Maintenance System

### Maintenance Of Traffic

Stage 1

Stage 2

### Constructability / Innovativeness

### Tunnel Support Facility

- **Administration & Maintenance Building**
  - ✓ P/C Concrete Wall Panels
  - ✓ 11 Service Bays
  - ✓ 17,400 Square Feet
- **Emergency Vehicle Services Building**
  - ✓ P/C Concrete Wall Panels
  - ✓ 3 Parking Bays
  - ✓ 3,800 Square Feet
- **Salt Dome**
- **Spreader Racks**
  - ✓ 3 Spreaders
- **Fuel Service Island**
- **Wash Rack**

# Thank You

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# Questions ?

and

# Answers !