Final Feasibility Evaluation Report for the Irvine Corona Expressway Project

Riverside-Orange Corridor Authority Meeting
January 22, 2010

Project Background

- Riverside County-Orange County Major Investment Study (MIS) - 2005
- $15.8M, SAFETEA-LU funds - 2005
- Feasibility study began - April 2007
- Field investigations completed - December 2008
- Feasibility evaluation report - December 2009
- Water resources monitoring - August 2008 - December 2009
- Agency cooperation
  - US Forest Service
  - Metropolitan Water District

ICE Feasibility Evaluation

Primary Issues Considered

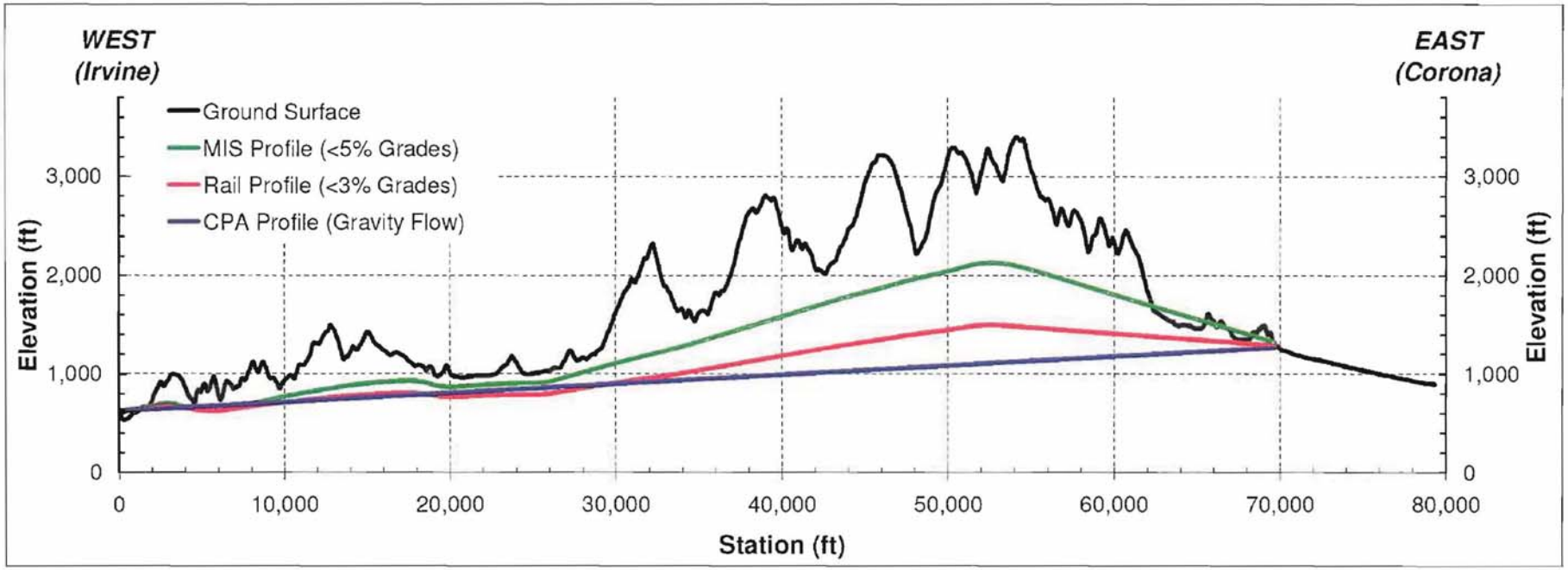
- Geologic, hydrogeologic/hydrologic, and geotechnical conditions
- Corridor concepts
- Tunnel configuration/cross sections
- Tunnel excavation and lining methods
- Tunnel systems (ventilation and air cleaning)
- Construction methods
- Construction and operations/maintenance costs

Geotechnical Findings

- Lower water pressures than expected
  - Favorable for tunnel mining and lining design
- Low water infiltration potential
  - Favorable during tunnel mining
- Challenging geologic conditions
  - Requires special tunnel boring machine and lining designs
- Impacts to groundwater
  - Requires groundwater controls during mining
- Impacts to surface water during operation
  - Requires mitigation/irrigation

Tunnel Profile (Road Grade)

MIS (5%); Rail (3%); and CPA (Gravity Flow)



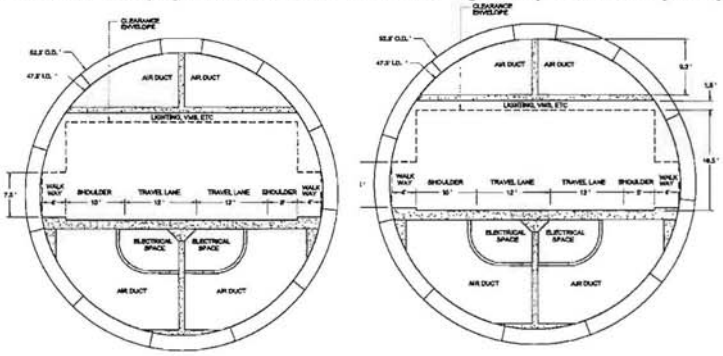
CPA - Central Pool Augmentation

Tunnel Design Considerations

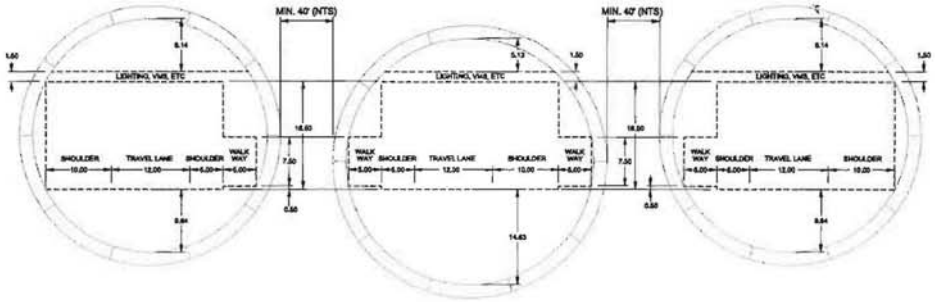
- Tunnel concepts evaluated
  - Full tunnel concept
  - Combination surface/tunnel concept
- Tunnel profiles: MIS, rail, and CPA water tunnel
- Tunnel cross sections
- Phased construction approach

Tunnel Cross Sections

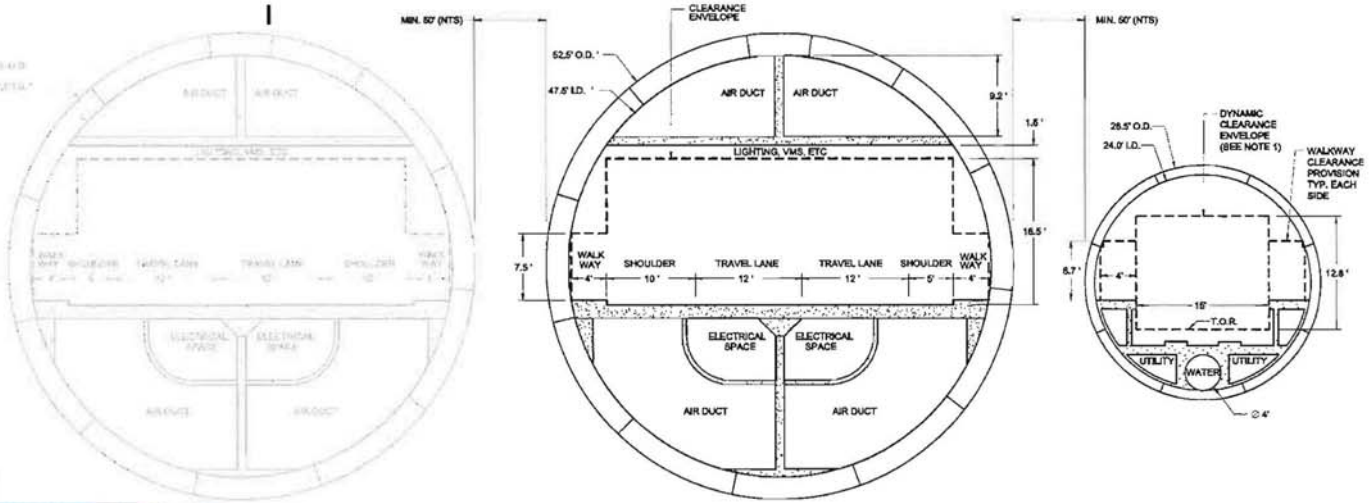
Two 52.5 foot (ft) Diameter Two-Lane Highway Tunnels (MIS)



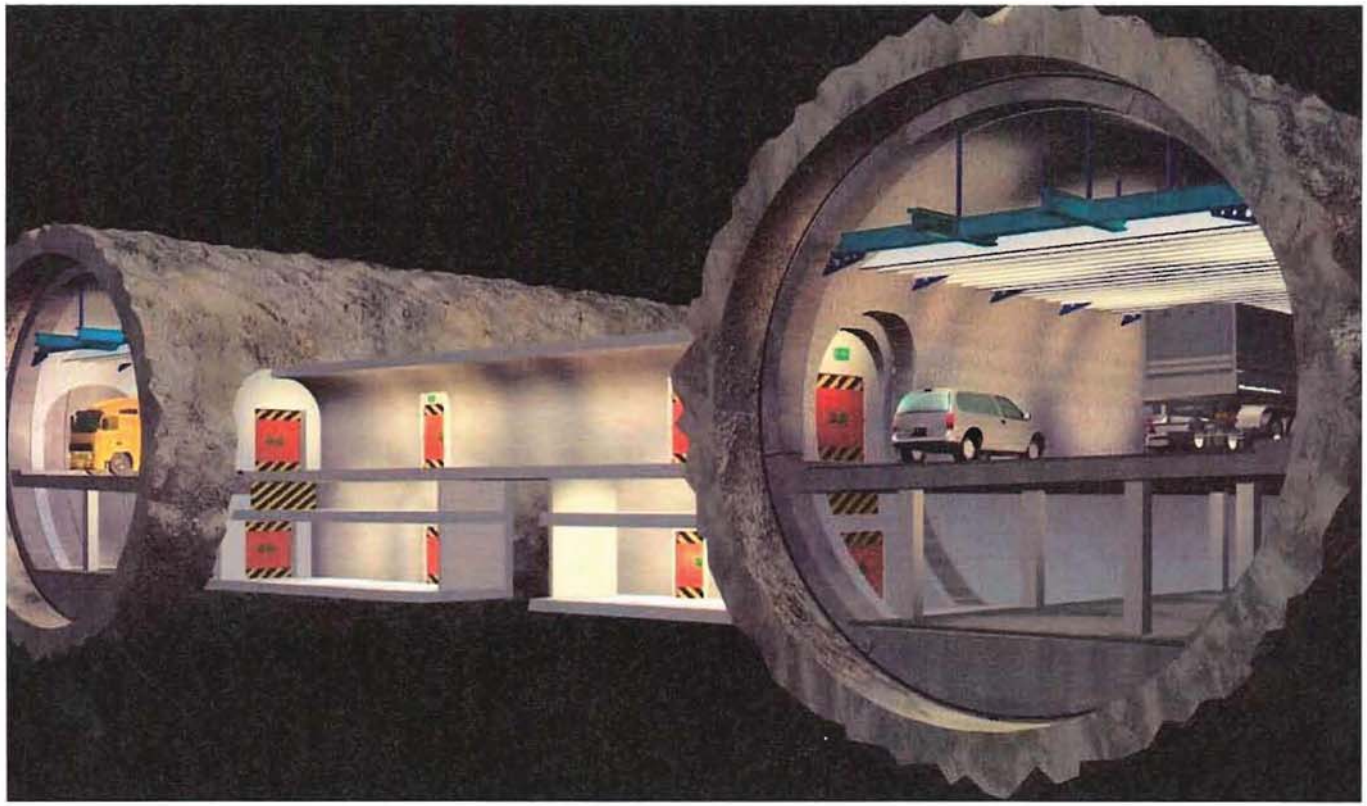
Three 40+ft Diameter Single-Lane Hwy Tunnels



Phase 1-Single 52.5 ft Diameter Two-Lane Highway Tunnel Paired with 26.5 ft Diameter Rail Tunnel
Phase 2-Construction of Second Vehicular Tunnel (Recommended)



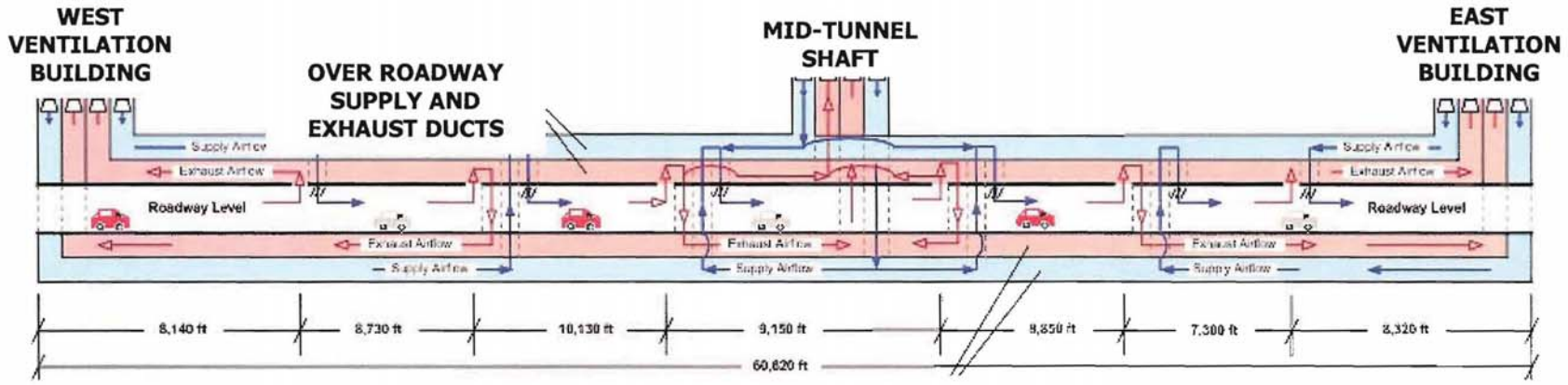
Cross Passages



Rendering for M30 highway tunnel cross passages, Madrid

Ventilation Issues and Concept

- 11.5 mile tunnel length
- Remove vehicle exhaust and heat
- Fire safety
- Ventilation shaft(s)
- Visual impacts
- Local air quality impacts mitigation



UNDER ROADWAY SUPPLY AND EXHAUST DUCTS

Construction Issues – Phase 1

- Portal and shaft access roads
- Muck disposal
  - Average - 9,600 to 16,600 tons/day
    (400 trucks or 18 railcars)
  - Peak of 19,200 to 33,200 tons per day
    (685 trucks or 65 railcars)
- Construction power demands
  - 32 to 47 megawatts per portal area
    (~25,000 to 40,000 households)
- Portal work area pads needed
  - 12 acres each portal
- Construction duration
  - 10.5 years

Cost and Revenue (Phase 1)

- **Paired highway and rail tunnel construction = $8.6 billion with contingency**

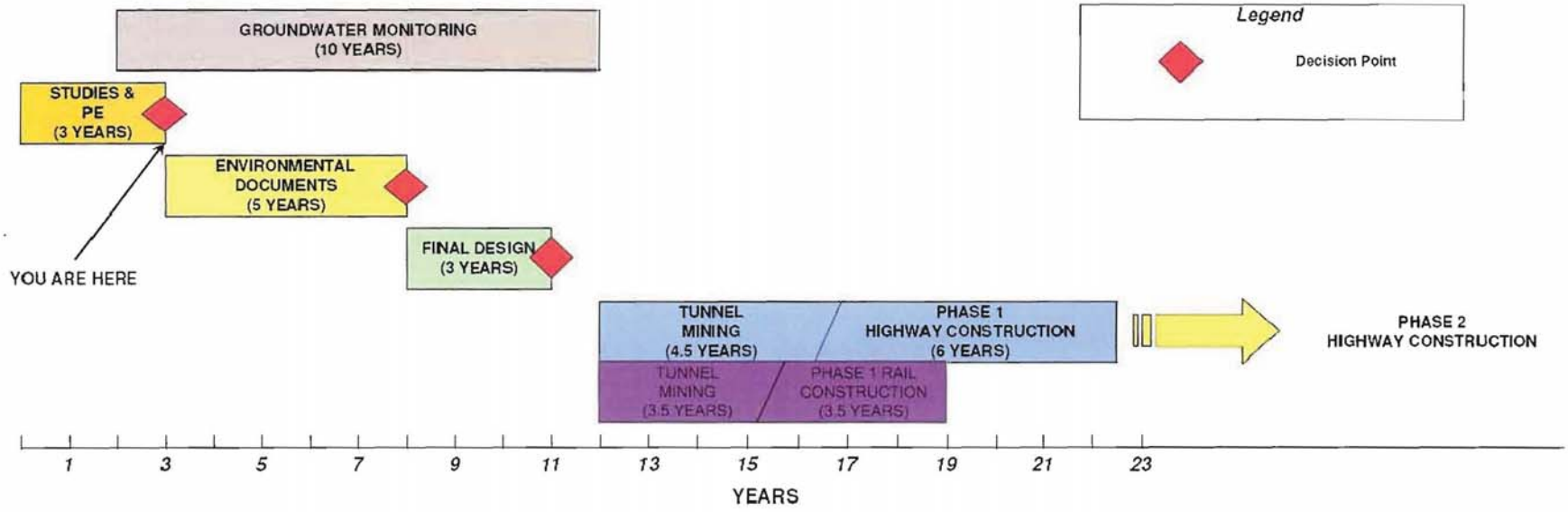
- **Operations and maintenance annually = $51.7 million with contingency**

- **Toll and revenue**
  - 55,000 daily trips = $278 million annually
  - 65,000 daily trips = $347 million annually

Major Project Challenges

- Funding sources
  - Toll revenue
  - Public-private partnership
- Power needs
  - Construction/operation
- Ventilation
  - Mid tunnel shaft
- Environmental issues
  - Air emissions
  - Water resources mitigation
  - Muck disposal and transport
- Construction schedule

ICE Estimated Timeline (2010)



ICE Tunnels Summary

- Highway and rail tunnel system is technically feasible
- Operates as a viable alternative to SR-91
- No fatal flaws identified
  - Design
  - Construction
  - Operation
- Significant challenges remain

Recommended Next Steps (2010)

- Complete toll and revenue study
- Conduct public private partnership workshop
- Continue water resource monitoring for up to one year