



# East Side Access Queens Tunnels & Structures

## Risk Assessment Overview

### ESA Queens Tunneling Program

September 26, 2011

## Introduction

The following is an update on three significant construction contracts in Queens that will build the underground link between the Harold Interlocking and the new LIRR Manhattan terminal below Grand Central Station. Risk assessments were conducted on the three primary contracts that are part of this program using a collaborative process that included all stakeholders.

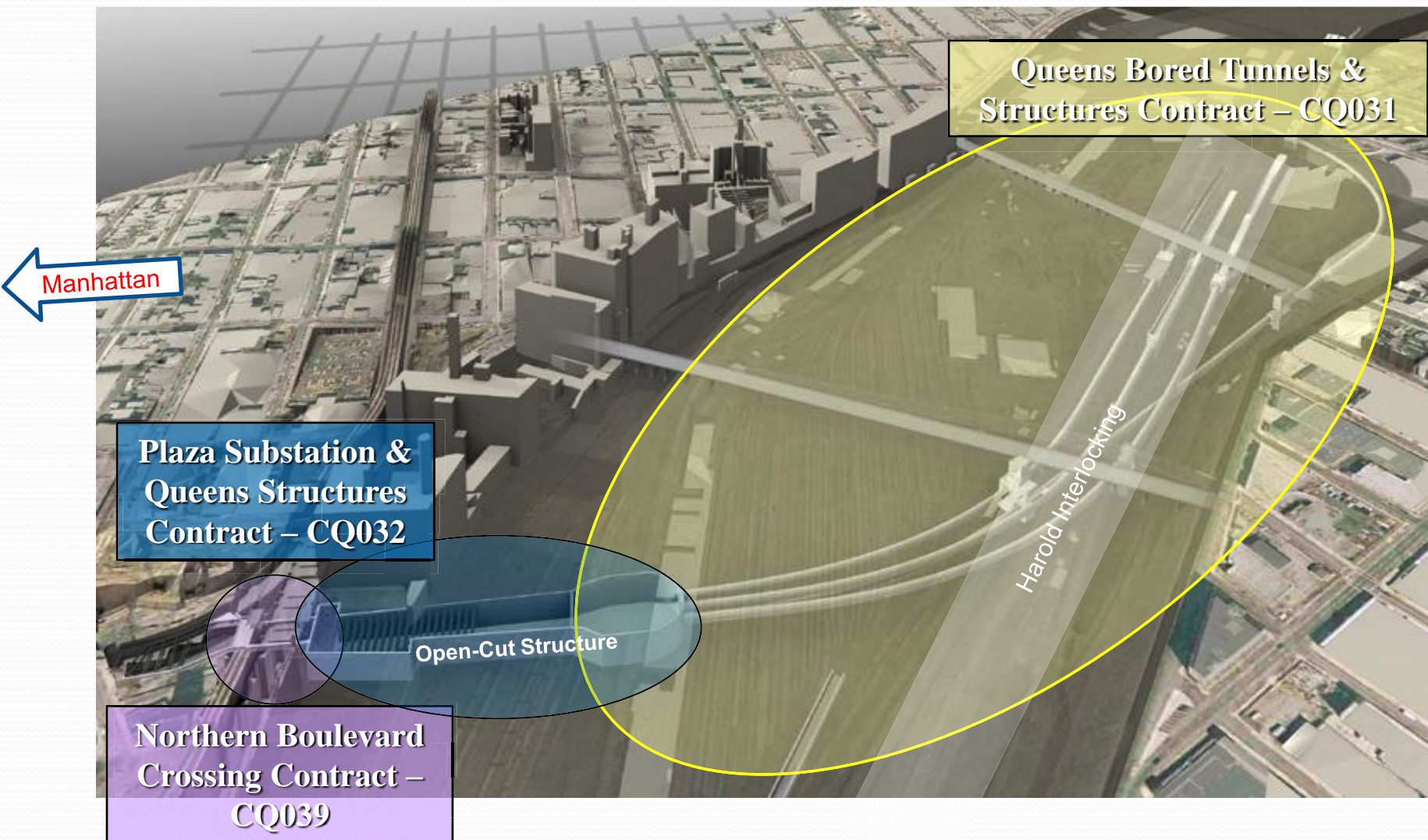
The Queens Tunneling Program represents 1 of the 3 primary work paths to completing ESA.

**Currently, the path through the Queens Tunneling Program is not critical and contains sufficient float to absorb the potential schedule delays that have been identified without affecting the ESA Revenue Service Date.**

MTACC is using the information from this analysis to develop proactive mitigation strategies to assure timely completion of these projects while also managing established budgets.

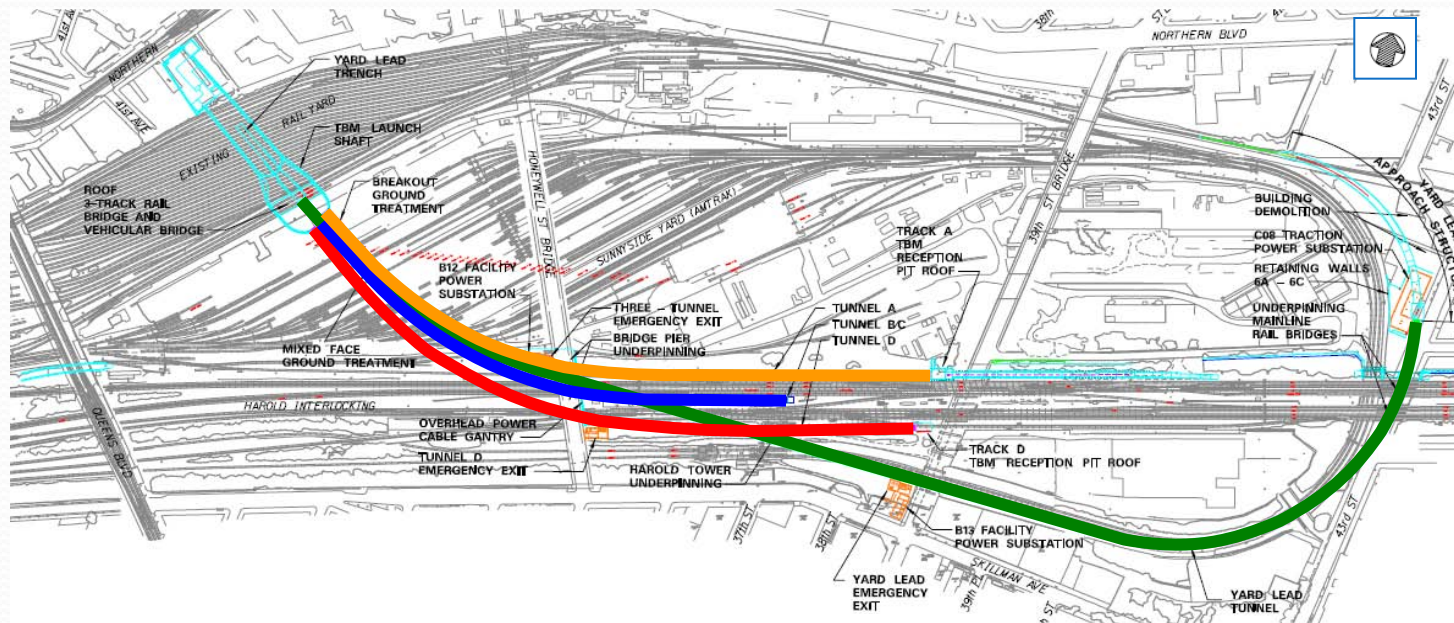


# Queens Tunneling Program



Three Queens Tunneling Contracts

# Queens Soft Ground TBM Tunneling: First Contract



## SCHEDULE:

- NTP, September 28, 2009
- Duration: 36 Months

## CONTRACT VALUE:

- \$734 million

Tunnel Drive	Soil	Rock/ Mixed	Total
A	2,180		2,180
B/C	1,739		1,739
D	2,162	60	2,222
Yard Lead	3,954	430	4,384
Total	10,035	490	10,525



## Queens Soft Ground TBM Tunneling Scope

This contract includes four major tunnels to be constructed via TBM.

Three revenue service tunnels:

- A, B/C and D
- Yard service tunnel referred to as the “Yard Lead”, which will eventually connect to a future train storage yard.

Unlike the current tunneling in Manhattan which is in solid rock, the TBM's are mining in glacial till, which is a mix of soil and boulders and is predominantly under the ground water table.

**These tunnels are being constructed directly below the transit operations of LIRR and Amtrak in the busiest commuter interlocking in North America. Tunneling starts from an open-cut structure under Sunnyside Yard where Amtrak and LIRR store trains, and then continues beneath the LIRR Main Line Tracks.**

There are two TBMs, and each will bore two tunnels. The first TBM named Molina was launched on May 17, 2011 and will bore the Yard Lead Tunnel and then tunnel D. The second TBM named T.E.S.S. was launched on August 9, 2011 will bore tunnel A and B/C.

# Major Risks and Mitigations - Queens Soft Ground TBM Tunneling

## March 2011 Risk Assessment Update Results

**Schedule:** 14 month exposure initially identified which has been reduced to current exposure of 7 months. Mitigations expected to reduce this further; no impact on overall ESA schedule

**Cost:** Several mitigations being implemented to reduce / eliminate the potential cost risk of \$25 million.

### Risks

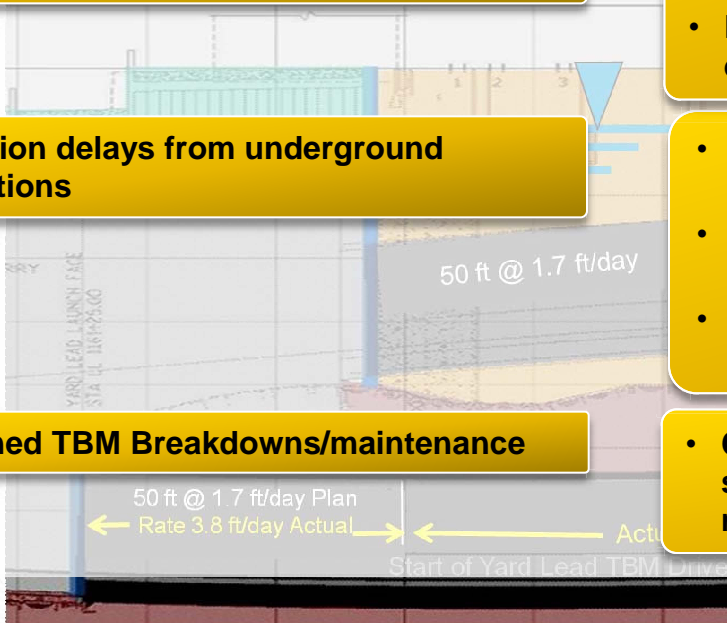
Excessive heave/settlement of track and railroad structures

Production delays from underground obstructions

Unplanned TBM Breakdowns/maintenance

### Mitigations

- Objective is not to Impact Railroad Operations
- Real time instrumentation program
- Tunneling to be continuous under mainline tracks to minimize vibration and risk of settlement
- Pro-active planning with LIRR has established on site emergency response with standby crew and materials
- Ground investigations were completed along the track alignment
- TBMs have been designed to address moderate sized boulders
- Tunneling production is a conservative rate and built into the schedule; currently ahead of schedule for both TBMs
- Create shafts to surface at preplanned locations where scheduled maintenance can be done proactively to minimize risk of delay due to need for unplanned maintenance



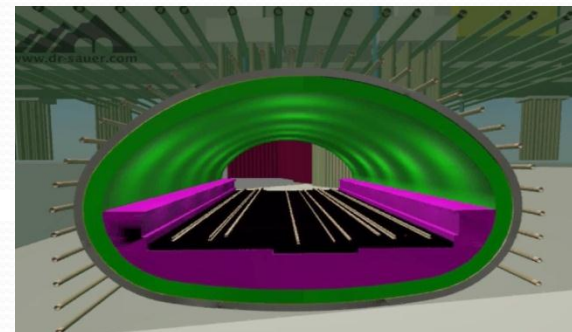
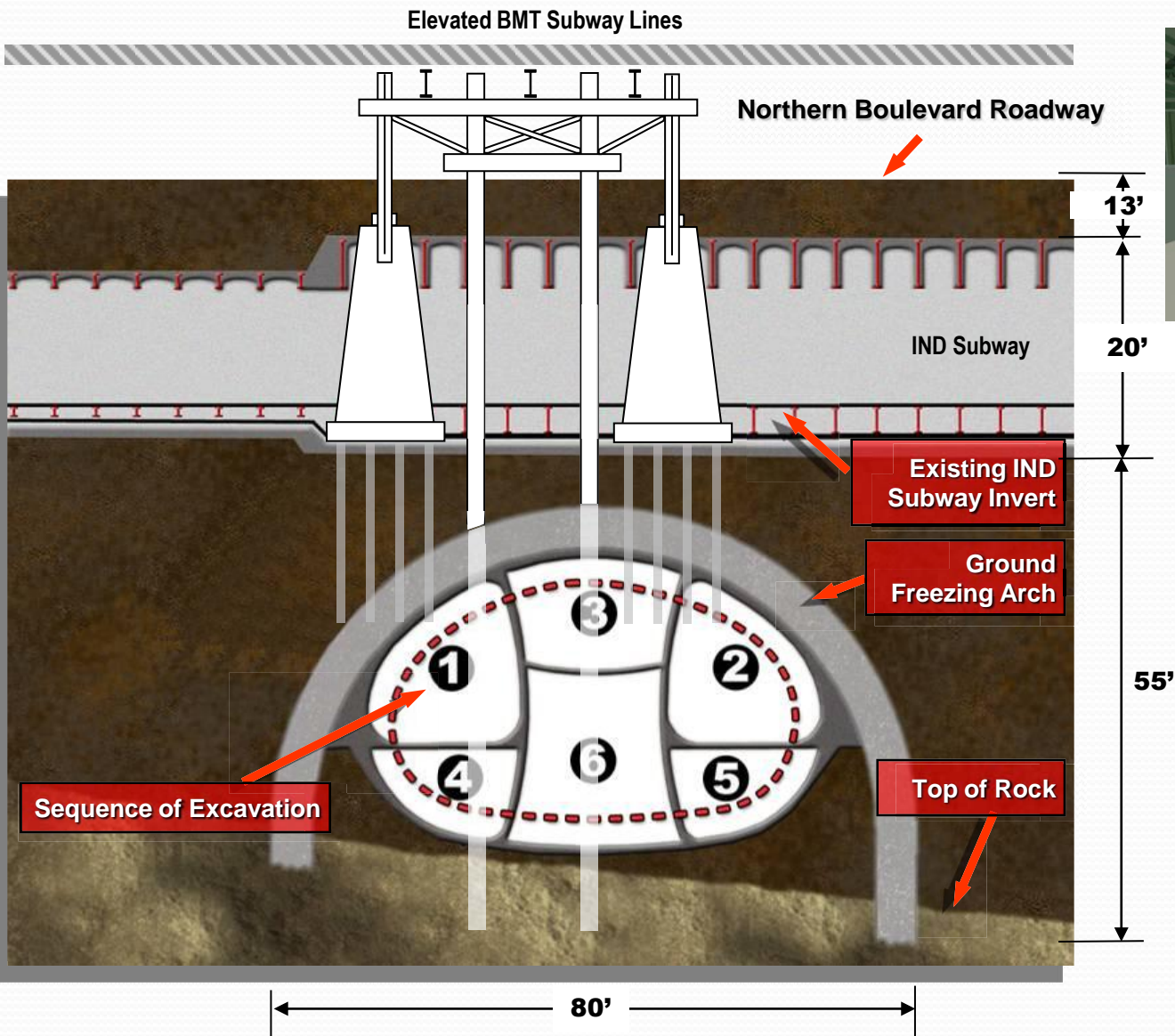
# Major Risks and Mitigations - Queens Soft Ground TBM Tunneling

*(Continued)*

## Status

- Top risks have active mitigation strategies in place
- The project realized 3 months of delay prior to the start of production TBM mining
- The initially identified schedule exposure of 14 months in March of 2011 has subsequently been reduced to 7 months now that TBM mining has commenced and risks associated with TBM preparation have passed
- Initial mining running slightly ahead of plan — now entering soil conditions for which machine is specifically designed

# Northern Boulevard Crossing: Second Contract



## SCHEDULE:

- Awarded: February 3, 2010
- 22 Months

## CONTRACT VALUE:

- \$84.9 million

## Northern Boulevard Crossing Scope

**This contract includes some of the most technically complex tunneling being performed on any project at MTA.**

The required 120' foot long tunnel section crosses underneath multiple critical structures that are stacked above one another. This includes the NYCT IND subway structure, the Northern Boulevard roadway, and the elevated NYCT BMT subway structure.

The tunneling is made extremely challenging by the need to underpin the existing structures above, the type of soil and rock that will be encountered, and the fact that we are building below the water table.

Currently the underpinning of the BMT elevated structure is completed and installation of the freeze piping for the arch is nearly complete. The freeze plant will start up in October and the freeze operation should be complete in November with excavation scheduled to begin in 2012.

# Northern Boulevard Crossing

## May 2011 Risk Assessment Results

**Schedule:** 10 month delay to start due to prior defaulted work; working to mitigate additional 10 month exposure per risk assessment; no impact on overall project schedule.

**Cost:** Mitigations should substantially reduce potential cost impacts of up to \$20 Million.

### Risks

Settlement or deflection of Existing Structures

Higher than expected rock elevation risk.

Sequential Excavation Risks

Delay to the start of the Plaza Substation by subsequent contractor

### Mitigation

- Installation of Compensation Grouting System
- Conducted successful compensation test program

- Contractor is preparing mechanical rock excavation plan as mitigation measure.

- Refined bracing strategies maximize staging for excavation

- Earlier access agreement negotiated to allow Substation contractor to access site and commence construction in Fall 2011

### Status

- Technical and quality issues with the defaulted contractor's work (slurry wall) and freeze pipe installation have realized 10 months of delay prior to the start of mining
- Agreement to turn over critical area to next contractor for Plaza Substation mitigates this delay and keeps the work off the critical path

# Plaza Substation and Structures :Third Contract



## ACCESS

Northern Blvd Crossing (CQ039)  
Turnover Area to CQ032 (Open-cut & B10 SS Area) Fall 2011

## ACCESS

Queens Open-Cut (CQ031)  
CQ031 turns over to CQ032  
July 2012

## SCHEDULE:

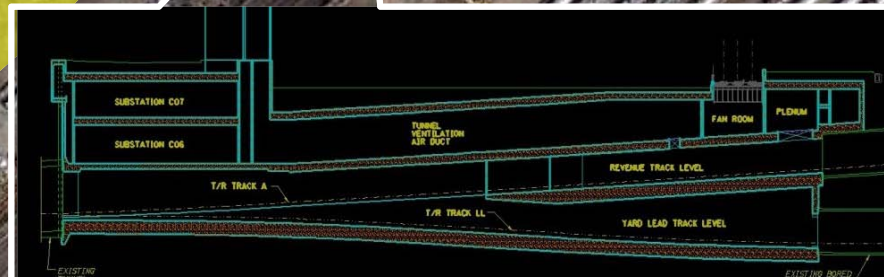
- Notice to proceed, July 2011
- Duration:36 Months

## CONTRACT VALUE:

- \$148 million

## ACCESS

Plaza Substation (CQ032)  
Work Begins in the Q Tip  
Area  
November 2012



Below grade sectional view of CQ032 Ventilation Plant at Open Cut

## Plaza Substation and Structures Scope

The Plaza substation and structures contract builds the necessary ancillary structures within and adjacent to the open-cut excavation in Queens as well as ESA ventilation plants along the 63<sup>rd</sup> Street Tunnel.

Work includes several ventilation facilities and the B-10 substation.

**Success for this contract is dependent upon timely access and interfacing with both the soft ground TBM tunneling contractor and the Northern Boulevard Crossing contractor.**

After detailed review of the Northern Boulevard and Queens TBM tunnel schedules, access turnover zones for a staged mobilization and access along the open-cut were included in the Plaza Substation contract.

# Plaza Substation and Structures

## March 2011 Risk Assessment Results

**Schedule:** Potential delay of 12 months primarily related to late access because of risks associated with prior contracts; Mitigations to these contracts previously described are expected to reduce this significantly; no impact on overall ESA schedule.

### Cost

- Potential cost increase of up to \$10 Million mitigated—good bid.

## Risks

Open-cut site access delays from the Queens Soft Ground Tunnel contract

Open-cut site access delays from Northern Boulevard Crossing contract

## Mitigations

- Transferred Yard Lead concrete scope to the Queens bored Tunnel contract allowing earlier construction
- Advanced turnover of portion of site from previous contractor has been negotiated. Allows critical work to proceed in fall 2011
- Strategic transfer of scope from this contract to active contract so work can get done earlier to further reduce the risk of delay

## Status

- Highest risks for delay come from access needed from prior contracts (Queens Bored Tunnels & Structures Contract and Northern Boulevard Crossing)
- Risk from turnover of site occupied by Northern Blvd. Crossing contract has been mitigated with access agreement
- Evaluating scope transfers between Plaza Substation contract and Queens Bored Tunnels & Structures Contract to eliminate access conflicts
- Bid results received were favorable and less than budget

## Summary

**The Queens Tunneling Program includes some of the most challenging work in the ESA project. Accordingly, MTACC in conjunction with the IEC and LIRR has utilized risk assessment to identify the most significant risks. These risks are being closely monitored and project management is implementing risk mitigation strategies to minimize any impacts to the programs cost and schedule.**

**Mitigation measures already implemented and planned give us a high degree of confidence that Queens tunnel and structures work will not become critical to the completion of the ESA project.**