

# The Construction Management Profession & CMAA

April 28, 2005

**International Project and Construction  
Management Union Conference  
Seoul, Korea**

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Presentation by  
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## Today's reality...

- Construction is risky, complex and challenging.
- Delays, changes, disputes, accidents cost more than ever.
- Owners don't have the expertise or the staff to stay on top
- Success demands collaboration... and *leadership!*

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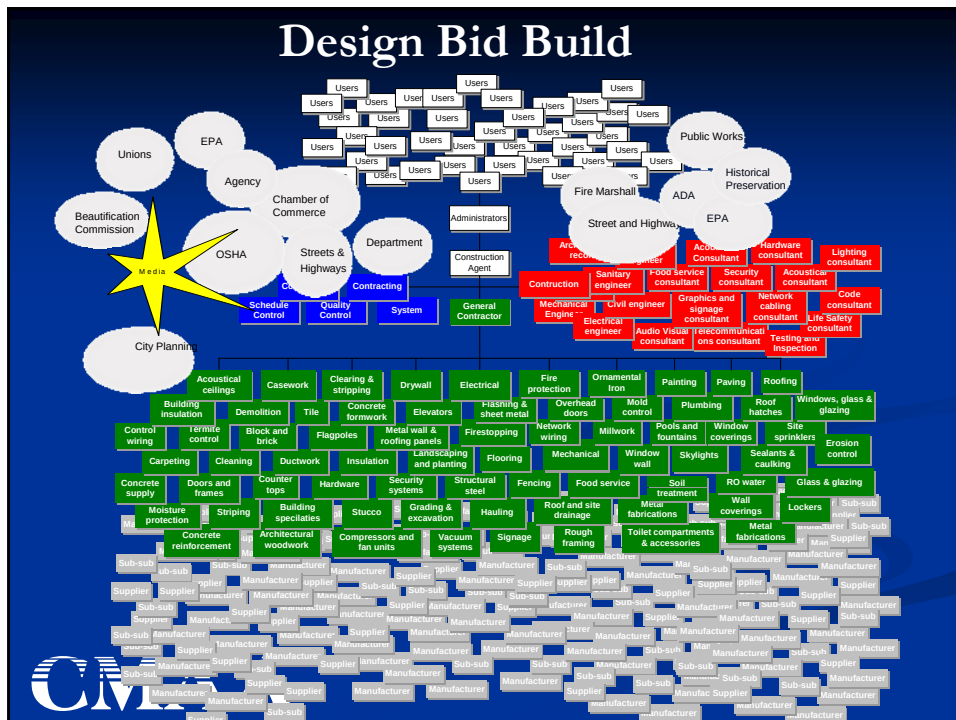
# What Happened to the “good old days”?

The construction industry responded to  
the demand for . . .

*lower/certain project and program costs,  
shorter schedules and greater innovation  
and introduced a variety of alternatives...  
such as Design-Build and CM At-Risk*

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## Design Bid Build



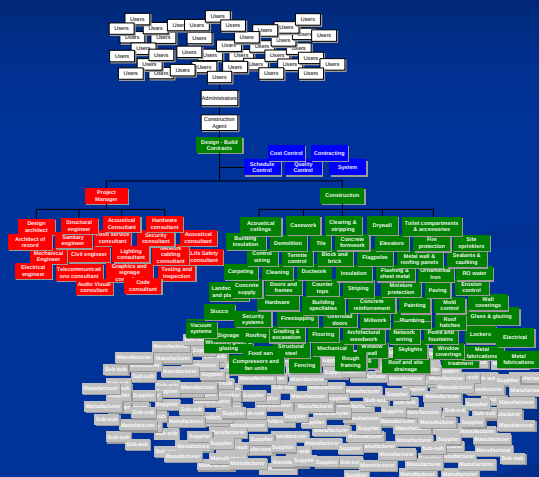
# Industry Paradigm Shift

- The role of long-standing relationships which formed the basis of “agreements” has been replaced by one-time, stand-alone contracts

*Risk and reward are evaluated, and expected, on each project*

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## Design Build



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## Proliferation of Delivery Choices

In the United States, 46 states allow some form of construction procurement other than traditional Design-Bid-Build.

*the expertise demanded of all the projects participants is greater than ever*

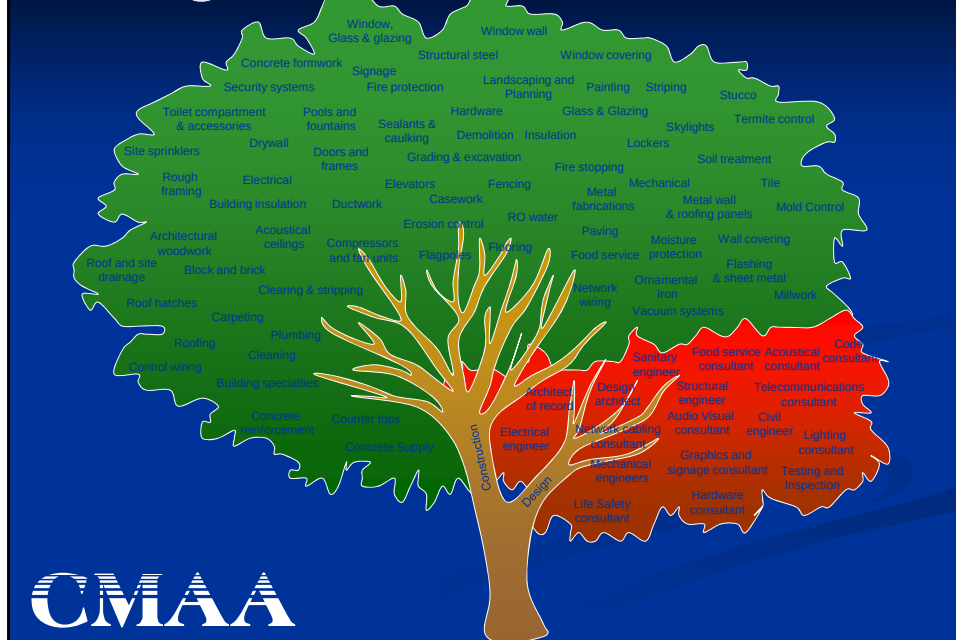


## Where does the CM fit in?

- Augments or represents the owner in today's complex contracting environment
- Provides the expertise necessary to achieve project goals
- Provides critical project/program leadership



# Design and Construction Process



## Construction Management

A professional practice that applies effective management techniques to the planning, design, and construction of a project from inception to completion for the purpose of controlling time, cost and quality.



## Professional CM pays off in:

- Speed of project completion
- Quality of finished job
- Quality of the construction process
- Cost savings
- Project safety
- Claims and dispute avoidance



## CM and delivery systems

- Each delivery system requires professional management.
- Professional Construction Management is delivery system neutral and fills a vital role in all widely used delivery systems.
- A CM can help assess and select the best delivery method for every project.



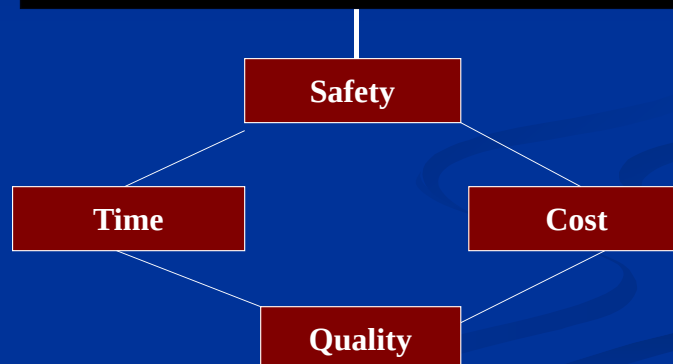
## Key owner needs

- Objective participation focused on the Owner's goals of project success.
- Involvement in pre-construction and planning.
- Continued commitment all the way through project delivery and commissioning.
- Responsive leadership and collaboration throughout.

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## The CM Always Acts in the Owner's Best Interests

**CONSTRUCTION MANAGER**



**CMAA**

## Enlightened Owners Want . . .

CM placed on the project team first to:

- Manage A/E schedule for design submissions
- Review A/E design submissions for constructability and adherence to the budget
- Manage the overall project schedule
- Manage the procurement of the construction contractor
- Provide quality assurance
- Manage the commissioning program
- Manage and coordinate third parties



## In Pre-design..

- program management
- site analysis and selection
- choice of delivery method
- preliminary budget and schedule
- general performance requirements
- forming a collaborative team





## During Design Phase..

- schedule & cost management
- support a responsive, esthetic design
- life cycle cost analysis
- constructability review
- detailed budget and schedule reporting
- technology implementation

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## During the bid process..

- procurement management
- pre-bid conference
- clear and complete bid documents
- evaluate and compare bids
- recommend choice

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## During construction..

- contract administration
- timely and full reports
- financial management and control
- manage change order process
- assure a safe workplace
- minimize delays and disputes
- manage close-out and commissioning



## The Role of the CM

- A new “leg to the stool”
- Industry recognized professional service
- Critical to the delivery of successful projects and programs



# CONSTRUCTION MANAGEMENT ASSOCIATION OF AMERICA

North America's only organization dedicated  
exclusively to the interests of professional  
program and construction management.



## About CMAA

- 2,900+ member Industry Association comprised of corporations, individual practitioners, owner practitioners and academia.
- 25 regional chapters serving local needs of members and their clients.
- Incorporated in 1982.



## CMAA's Mission and Vision

### Mission:

*To promote professionalism and excellence in the management of the construction process.*

### Vision:

*To be the recognized authority in the management of the construction process.*



## The Goals of CMAA

- Promote international recognition and understanding of professional CM services for capital project execution.
- Provide CM Industry advocacy at all levels of government.
- Promote professional development of CMAA membership to assist members in marketing themselves and their companies.
- Promote research & development of CM practices.
- To represent all segments in the CM industry.



## CMAA Code of Ethics

|                                     |                             |
|-------------------------------------|-----------------------------|
| Client Service                      | Fair Compensation           |
| Representation of<br>Qualifications | Release of<br>Information   |
| Standards of<br>Practice            | Public Welfare              |
| Fair Competition                    | Professional<br>Development |
| Conflicts of Interest               | Integrity                   |



## Professional Development

- Conferences & Trade Shows
- Online Education: Web-based training
- Distance Education: CMs TalkLive!
- Certification Test Prep Course Standards of Practice Course
- Project Leadership Training Program



## Contract Documents & Publications

- *CMAA Standards of Practice*
- *Standard Forms of Agreement for Agency CM*
- *Standard Forms of Agreement for CMAR*
- *Time Management, Quality Management, Cost Management, Program Management*
- *Contract Administration Procedures*
- *CM Leadership Development Guidelines*



## CMAA Foundation

- CMAA's Foundation has awarded more than \$40,000 in scholarship support to students enrolled in college level programs in Construction Management.
- The Foundation Funds research projects in collaboration with Universities.



# **Construction Manager Certification Institute (CMCI)**

**The Construction Manager  
Certification Institute is an  
independent administrative body of  
CMAA responsible for certification of  
Professional Program & Construction  
Managers.**

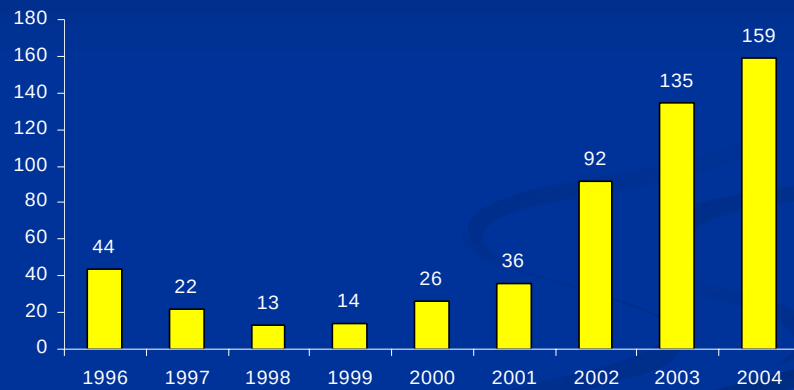


## **CM Certification Goals**

- **Improve Professional Practice through the establishment of professional development goals**
- **Identify the CM body of knowledge and skills necessary for the successful practice of CM/PM**
- **Recognize individuals who demonstrate knowledge and experience essential to the practice of CM & PM**



## Total CCMs by Year



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Numbers as of 12/31/04

## A Perspective: Program Management and Construction Management

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## Program Management and Construction Management

Construction Management traditionally involves a single project

- Project delivery method and financing may have already been established by Owner
- CM individuals involved during the Design Phase (generally 30% complete and later)
- Yields either a CM-at Risk or Agency CM
- Skills required include constructability, pricing, sequencing, procurement, etc.



## Distinction between Program Management and Construction Management

- Program Management involves multiple projects (within a larger project) involving all phases of a project's life cycle
  - Planning/Conceptual
  - Design
  - Construction Contracting
  - Construction
  - Completion and Testing
- PM often serves as an extension of Owner's staff



## **Distinction between Program Management and Construction Management (continued)**

- Significant influence over program early in life cycle regarding financing, delivery methods, standards, criteria, project priorities, control methods
- Risk Management now a major discipline that Owners specify



## **Organizational Models**

**Industry Survey shows 4 basic Organizational Models utilizing Program Management**

- Agency/Owner PM Organization
- Agency/Owner Replacement
- “PM Lite”
- Integrated PM Organization



# Knowledge and Skill Sets Required

In addition to traditional CM skills and knowledge, PM requires understanding of:

- Project Financing
- Strategic Project Delivery (Public Private Partnerships, etc.)
- Agency and Regulatory Coordination
- External Communications (Communities, Media, Governmental agencies, Program participants, industry groups, etc.)



## Construction Management Discussions of Two Projects

### ENGLAND

Union Railways/London and Continental Railways Ltd.

CHANNEL TUNNEL RAIL LINK

### USA

Metropolitan Transportation Authority's

**SECOND AVENUE SUBWAY**



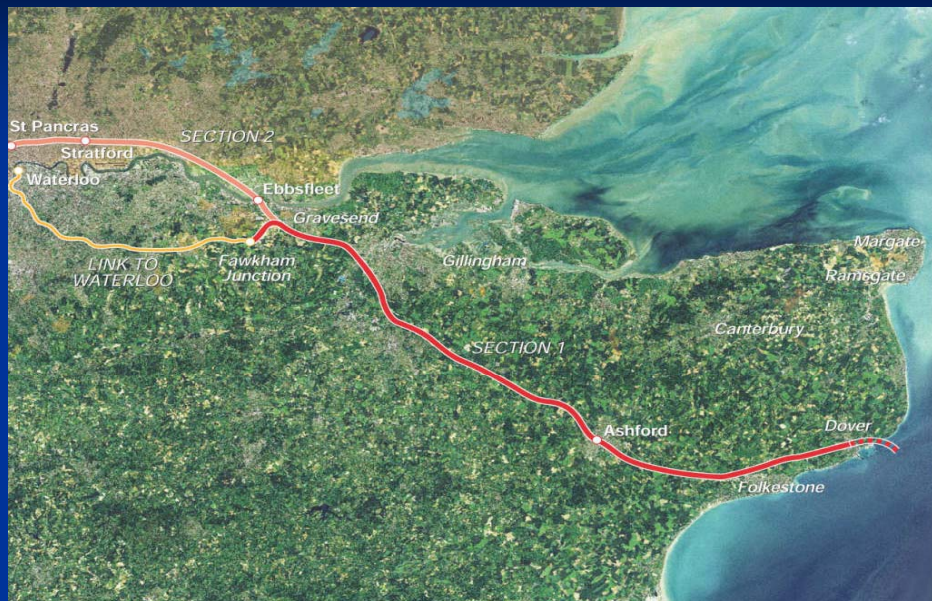
# Channel Tunnel Rail Link

ARUP, BECHTEL, HALCROW,  
SYSTRA

Union Railways  
(wholly owned subsidiary of London  
Continental Railways Ltd)

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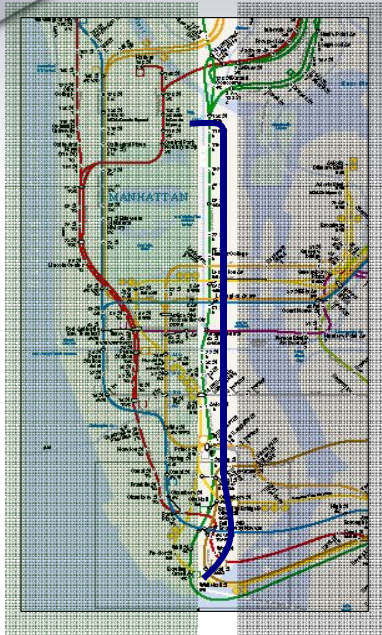
## “Second Avenue Subway”

DMJM+HARRIS\*ARUP

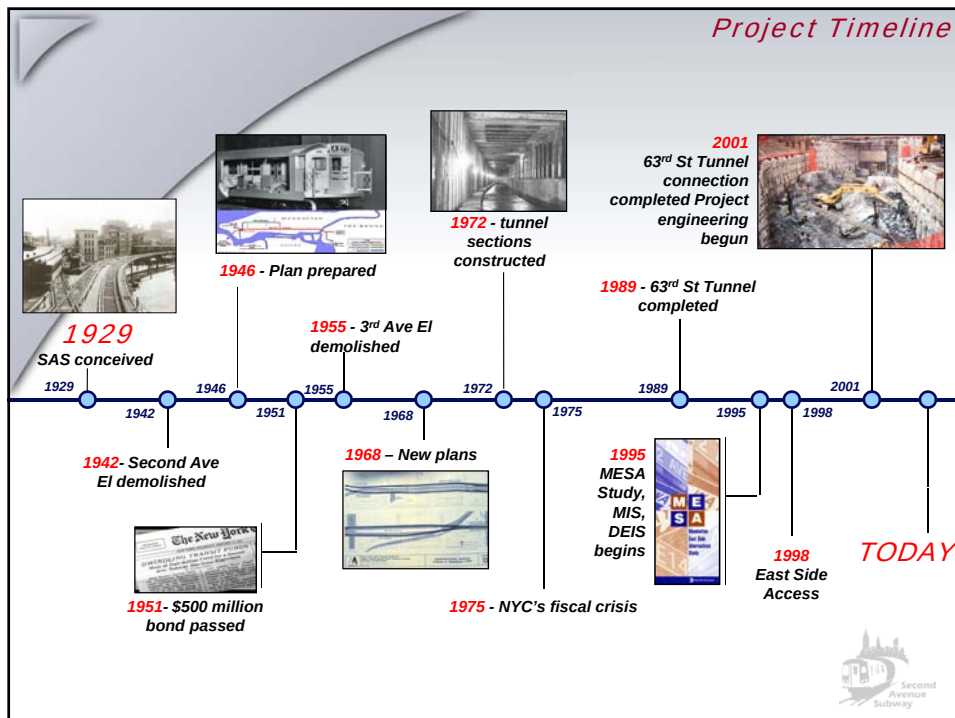
Metropolitan Transportation Authority  
*Capital Construction*

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## SECOND AVENUE SUBWAY



## Project Timeline



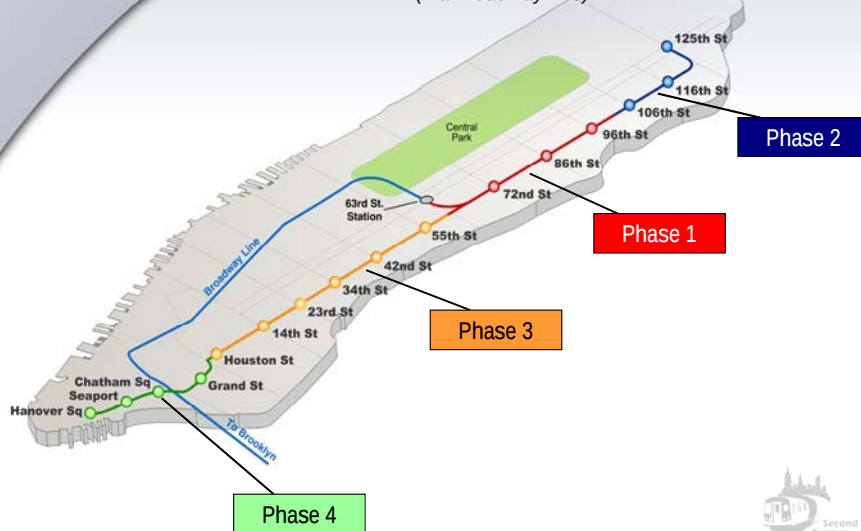
## Project Scope

- 8.5 miles new track
- 16 new stations
- 1 renovated station
- 2 services, T & Q
- linked to existing Q line
- Yards for 28 trains
- Transfers to 7 other rail lines



## SECOND AVENUE SUBWAY

- 8.5 miles, 2 tracks, 16 stations
- Two new services:
  - Between East Harlem & Lower Manhattan
  - Between East Harlem & West Midtown / Brooklyn (via Broadway line)

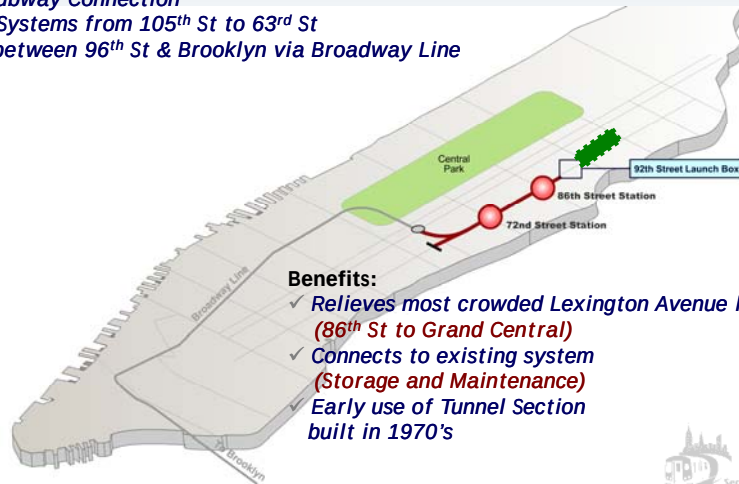




## Phase 1

### Scope:

- Tunnels from 92<sup>nd</sup> St to 62<sup>nd</sup> St
- Stations at 96<sup>th</sup> St, 86<sup>th</sup> St, 72<sup>nd</sup> St and 63<sup>rd</sup> St
- 63<sup>rd</sup> St Subway Connection
- Track & Systems from 105<sup>th</sup> St to 63<sup>rd</sup> St
- Service between 96<sup>th</sup> St & Brooklyn via Broadway Line



### Benefits:

- ✓ Relieves most crowded Lexington Avenue line (86<sup>th</sup> St to Grand Central)
- ✓ Connects to existing system (Storage and Maintenance)
- ✓ Early use of Tunnel Section built in 1970's



## Environmental Process

### Environmental Work

- Record Of Decision Received on July 8<sup>th</sup>, 2004
- Held Public meetings to discuss:
  - Station entrances
  - Ancillary facilities
  - Construction Methods



## Preliminary Engineering

- Completed Conceptual Design
- Completed Preliminary Engineering Design Full Length of Second Avenue Subway
- Working on Extended Preliminary Engineering for Phase 1 Scope of Work (96<sup>th</sup> Street to 62<sup>nd</sup> Street)

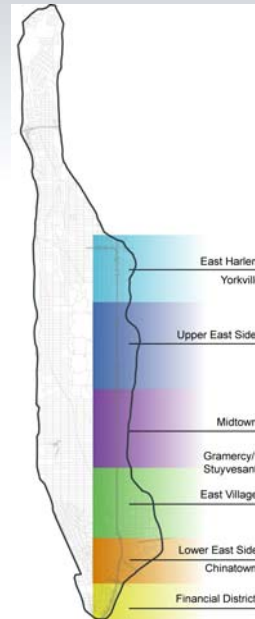


## Preliminary Engineering

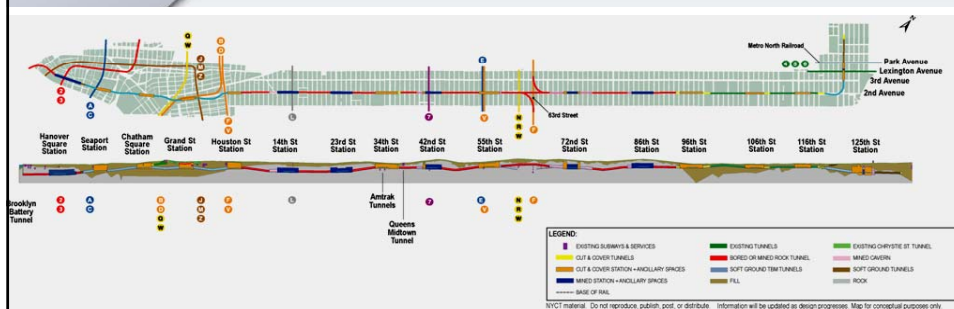


## Basis of Alignment

- Avoid damage to abutting structures
- Reduce impact on street and utilities
- Bypass existing transit lines
- Skirt major immovable utilities
- Allow a 63rd street connection
- Utilize existing tunnel
- Manage COST



## Alignment



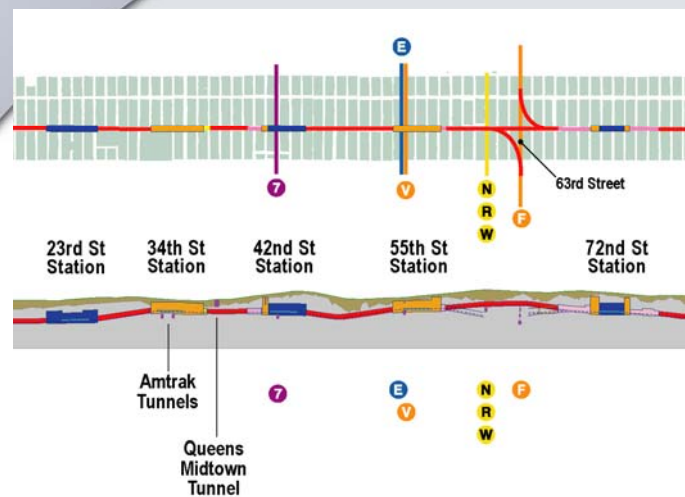
The Second Avenue Subway: 8½ mile, 16 station, two-track system



## Alignment - Downtown



## Alignment - Midtown





## Alignment - Uptown



## Tunnels

### Tunnels

#### ▪ Tunnel Boring Machines

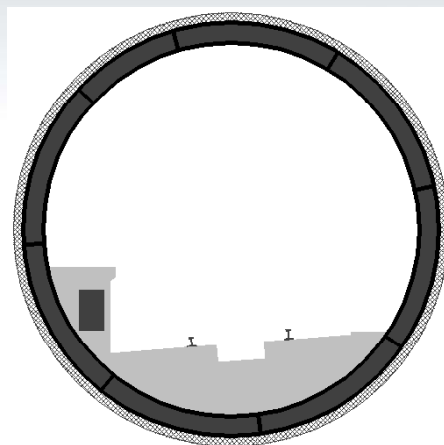
- Mix Shields
- Slurry/EPB
- Hard rock TBM

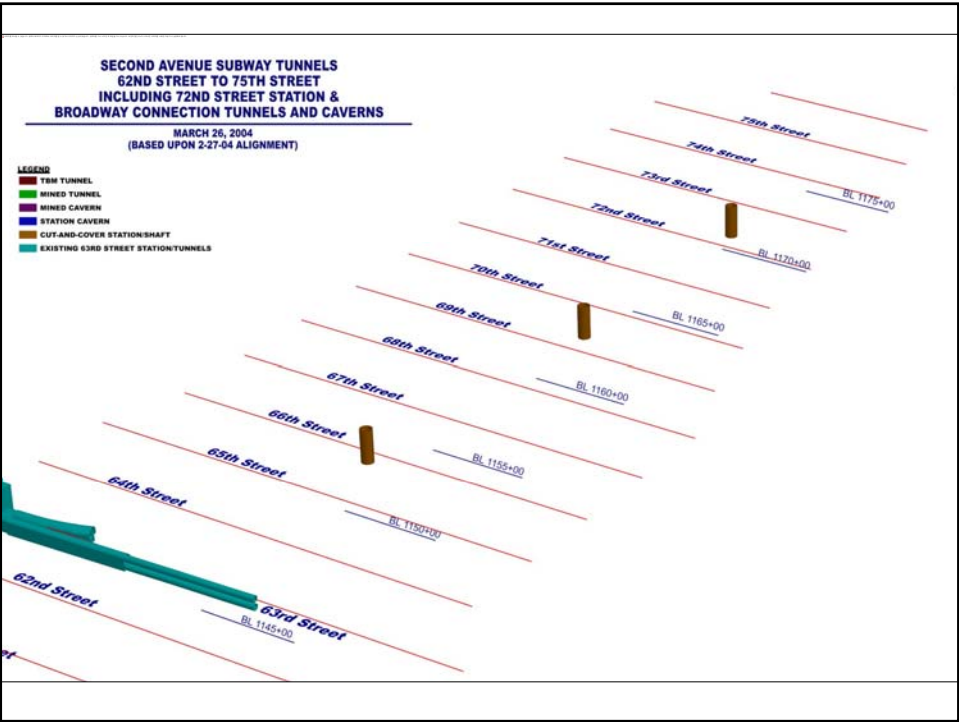
#### ▪ Mined Tunnels

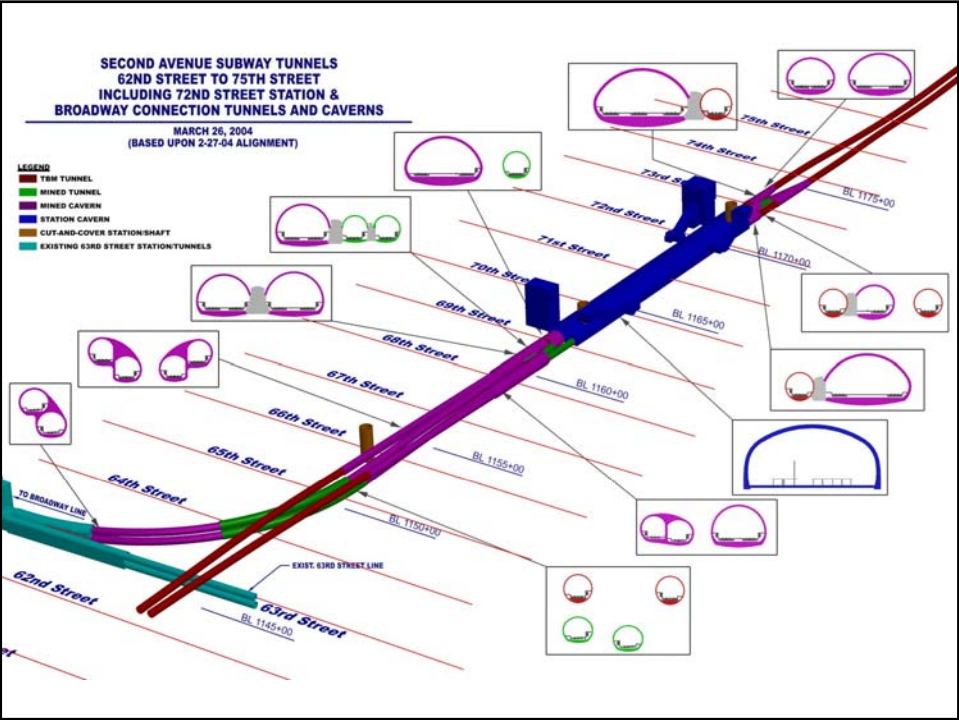
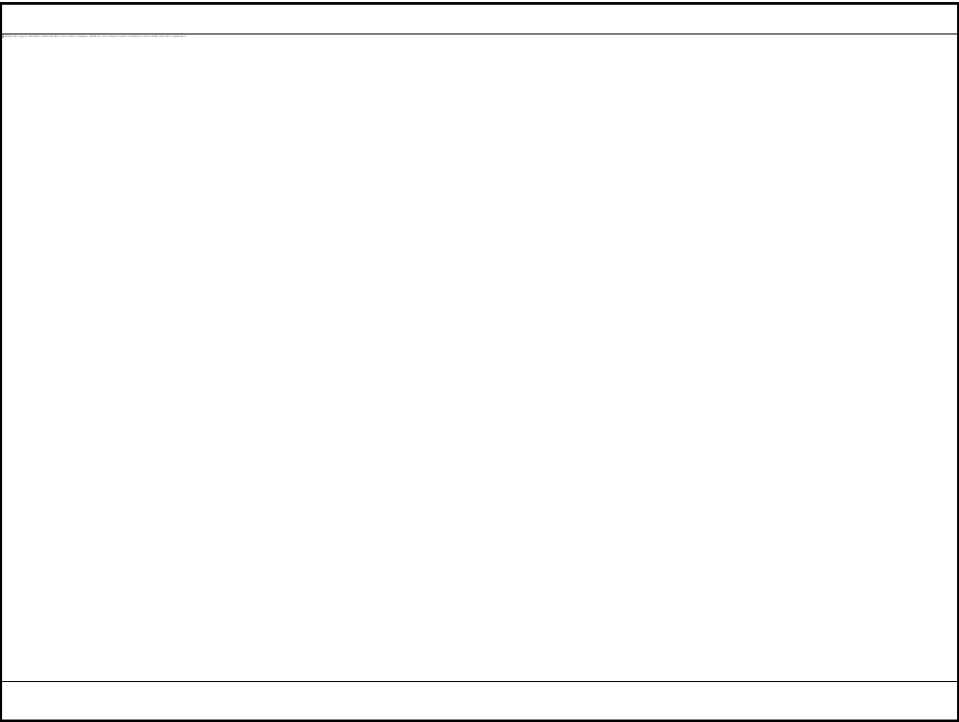
- Roadheaders
- Drill & Blast

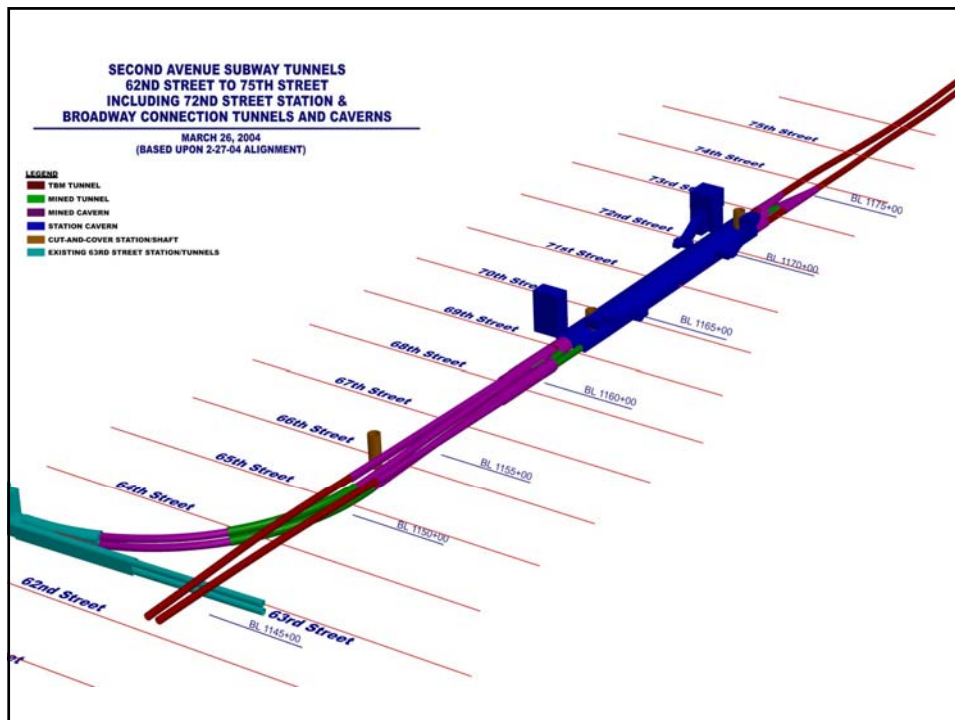
#### ▪ Cut & Cover Tunnels

- Slurry Walls
- Soldier Piles









## Key Issues

- **Passenger Flow / Level of Service**
- **Fire and Life Safety**
- **Entrance Locations**
- **Ground Conditions**
- **Project Alignment**



## Station Types

### Station Types

- **Cut-and-Cover Stations**

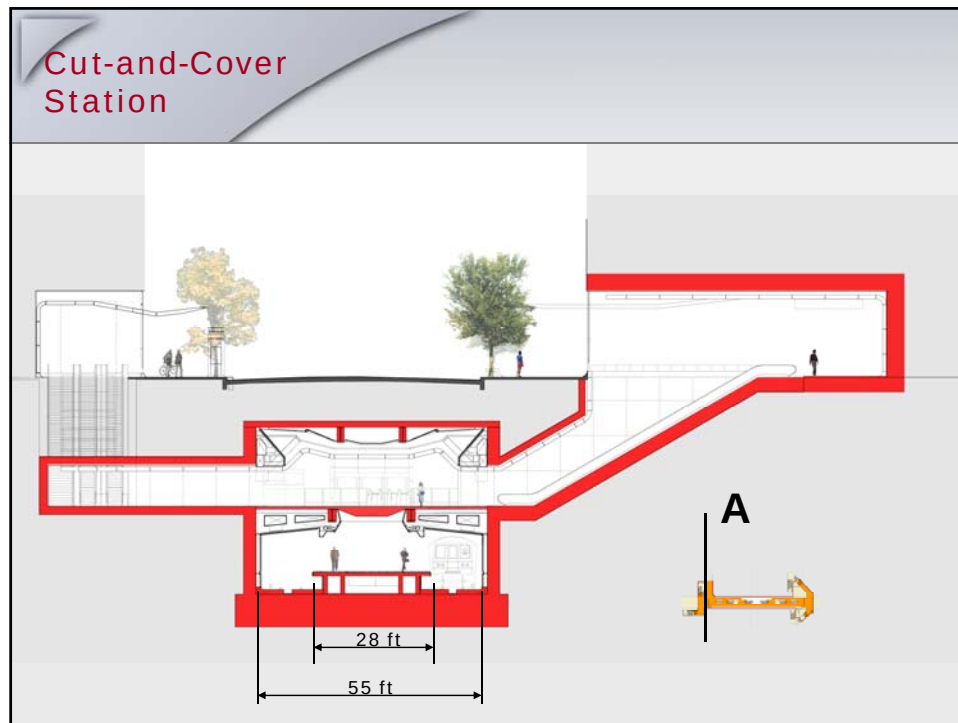
- Slurry Walls
- Conventional

- **Mined Stations**

- Drill-and-Blast
- Roadheader
- Mined Crossover



*Cut & Cover Construction*



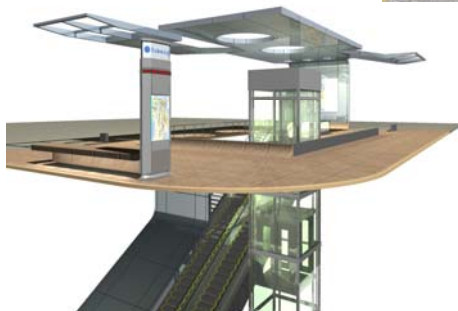
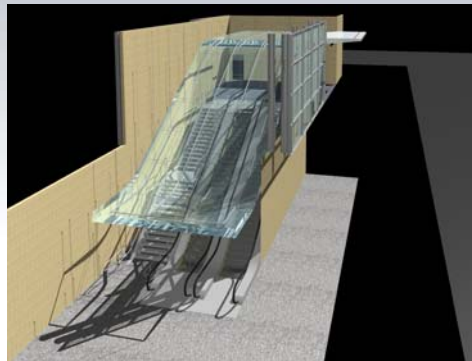
*Deep Mined Construction*

## Integration of Design

- Passenger Planning
- Structures
- Smoke Management, Egress
- Station Ventilation and Air Tempering
- Power, Lighting
- Communications
- Acoustics
- Program Requirements



## Entrances





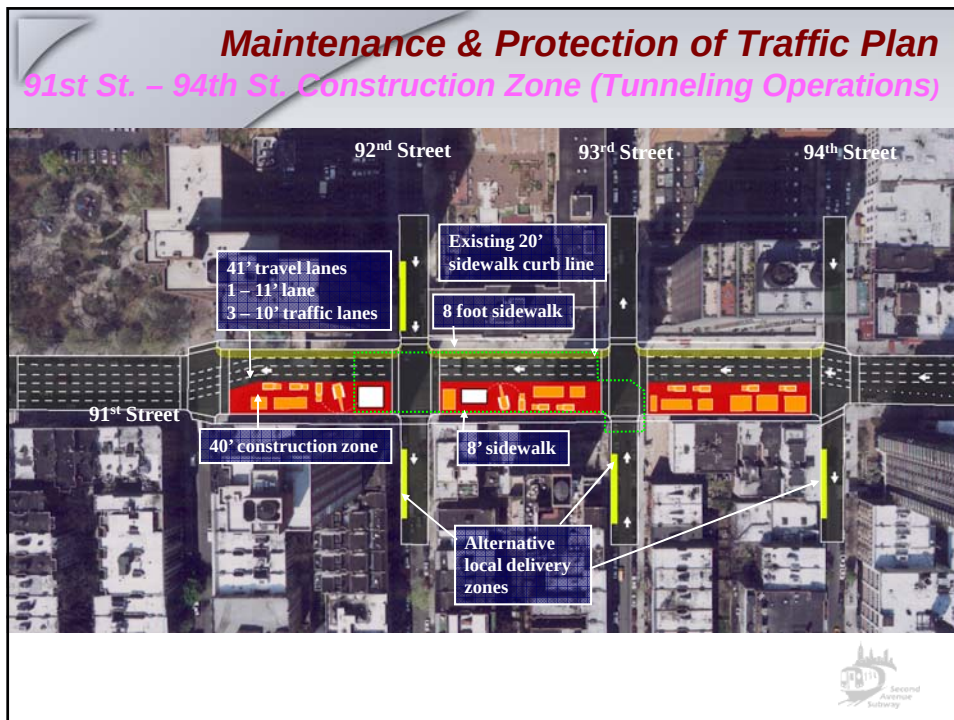
## Construction Schedule

|                                                            | 2004 | 2005 | 2006      | 2007      | 2008      | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|------------------------------------------------------------|------|------|-----------|-----------|-----------|------|------|------|------|------|------|
| (1)TBM Tunnels 92 <sup>nd</sup> –62 <sup>nd</sup> & Shafts |      |      | 45 months |           |           |      |      |      |      |      |      |
| Construct 96 <sup>th</sup> Street Station & Finishes       |      |      | 55 months |           |           |      |      |      |      |      |      |
| Shaft & Connection at 63 <sup>rd</sup> Street West         |      |      |           | 36 months |           |      |      |      |      |      |      |
| 72 <sup>nd</sup> Street Station/Finishes & Crossover       |      |      |           |           | 49 months |      |      |      |      |      |      |
| 86 <sup>th</sup> Street Station/Finishes & Crossover       |      |      |           |           | 50 months |      |      |      |      |      |      |
| Power, Signal, MEP, Track Work                             |      |      |           |           | 53 months |      |      |      |      |      |      |



## Managing the Risk

- **Geotechnical Advisory Board**
- **Cavern Peer Review**
- **Structural/Architectural and Mechanical Peer Reviews**
- **NYCT Independent Value Engineering**



**Status of Third Party Interfaces**

- **Parks**
- **Property**
- **Interagency Coordination ( DOT, DEP, FDNY, ConEd, ECS, etc)**

The logo for the Second Avenue Subway is located in the bottom right corner of the slide.

## Contract & Reference Documents

### Contract Documents

- ✓ General Requirements
- ✓ Contract Drawings
- ✓ Standard Drawings
- ✓ Technical Specifications
- ✓ Design Criteria Manual
- ✓ CADD Manual
- ✓ Geotechnical Baseline Report
- ✓ Geotechnical Data Report
- ✓ Hazmat Report
- ✓ Property Acquisition Due Diligence Report

### Reference Documents

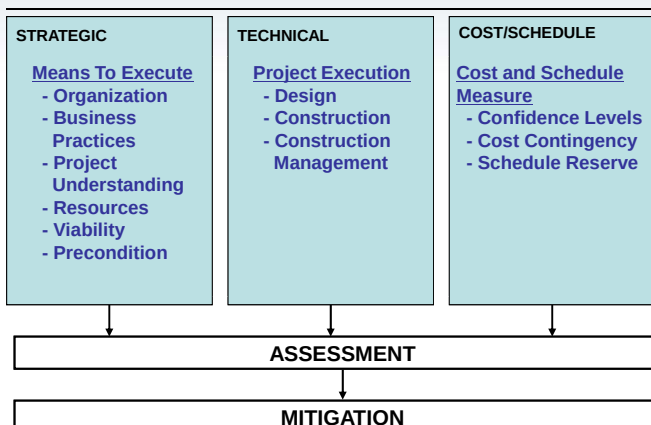
- ✓ Indicative Design Report
- ✓ Utility Test Report
- ✓ Historical Geotechnical Information
- ✓ Geotechnical Interpretive Report
- ✓ Construction Safety & Health Plan
- ✓ Construction Environmental Protection Program
- ✓ Building Information Report



## Risk Management Program

POTENTIAL RISKS

### Risk Register



## Risk Mitigation Options

- **Avoid**
- **Transfer**
- **Reduce Likelihood and/or Consequence**
- **Insurance**



## Construction Safety



- **Contractor Specific H.A.S.P.**
  - *Written Underground Safety Plan*
  - *OSHA 30 hr Training*
  - *Site Safety Manager*
  - *Union Safety Miner – Each Shift*
  - *Safe Equip Operating Radius*
  - *Ventilation*
    - ✓ - *Air Monitoring*
    - ✓ - *CFM / Man*
    - ✓ - *CFM / HP in Equip*
  - *Rock Scaling After Blast*



## The Future



## CMAA & IPCMU

- IPCMU has taken the lead in advancing the Project and the Construction Management profession internationally
- CMAA has taken the lead in developing the definitive Construction Management Standards of Practice and defining the CM process in the US and continuously extending alliance internationally

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## CMAA & IPCMU

**It Only Makes Sense That IPCMU  
and CMAA Should Continue to Work  
Together to Improve the Standards  
of our Design and Construction  
Professions**



## CMAA UPCOMING EVENTS

*Creating collaborative teams:  
A solution for the industry -- A mission for the profession*

### **Spring Conference & Leadership Forum**

Denver, Colorado

May 23 – 24, 2005

### **CMAA National Conference & Trade Show**

Huntington Beach, California

September 11– 13, 2005



Thank you

CMAA