

ARCHITECTURE  
ENGINEERING  
INTERIORS  
PLANNING

**KZFD=SIGN** 

# Precast/Prestressed Concrete Slabs used in Riverfront/Lakefront Walkways

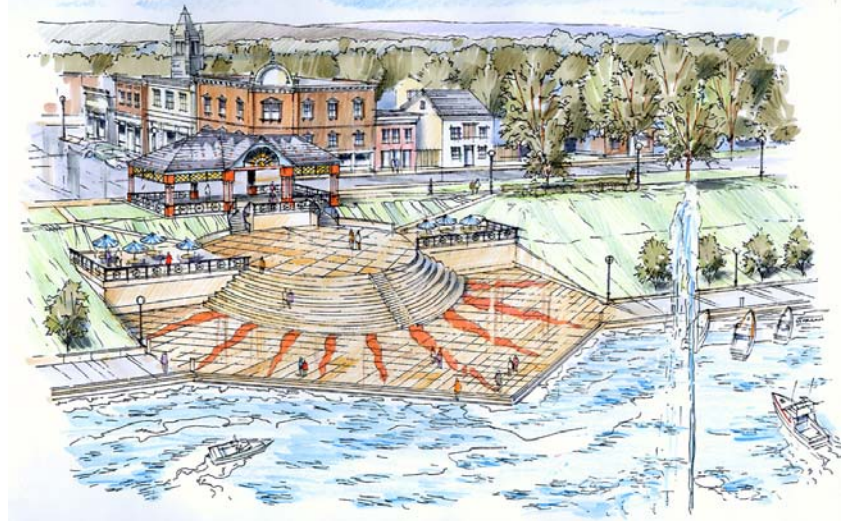
**By: David A. Tomley, P.E. and  
Donald E. Flynn, P.E.**

## Outline:

- I. Riverfront Projects
- II. Precast Elements
- III. Design Considerations
- IV. Precast Details
- V. Why Use Precast for Riverfront/Lakefront Projects?

# Riverfront Projects

- Phase I
  - Riverbank restoration
  - Soil stabilization
  - Tree preservation
  - Wall/overlooks
  
- Phase II
  - Stairway/ADA ramps
  - Historic map marker
  - Gateway entrance
  - Retaining wall terraces/seating



- Phase III
  - Riverbank stabilization
- Phase IIIB
  - Gateway plaza (Main Street)



## City of Maysville, Kentucky - Existing Riverfront



City of Maysville, Kentucky - Riverfront

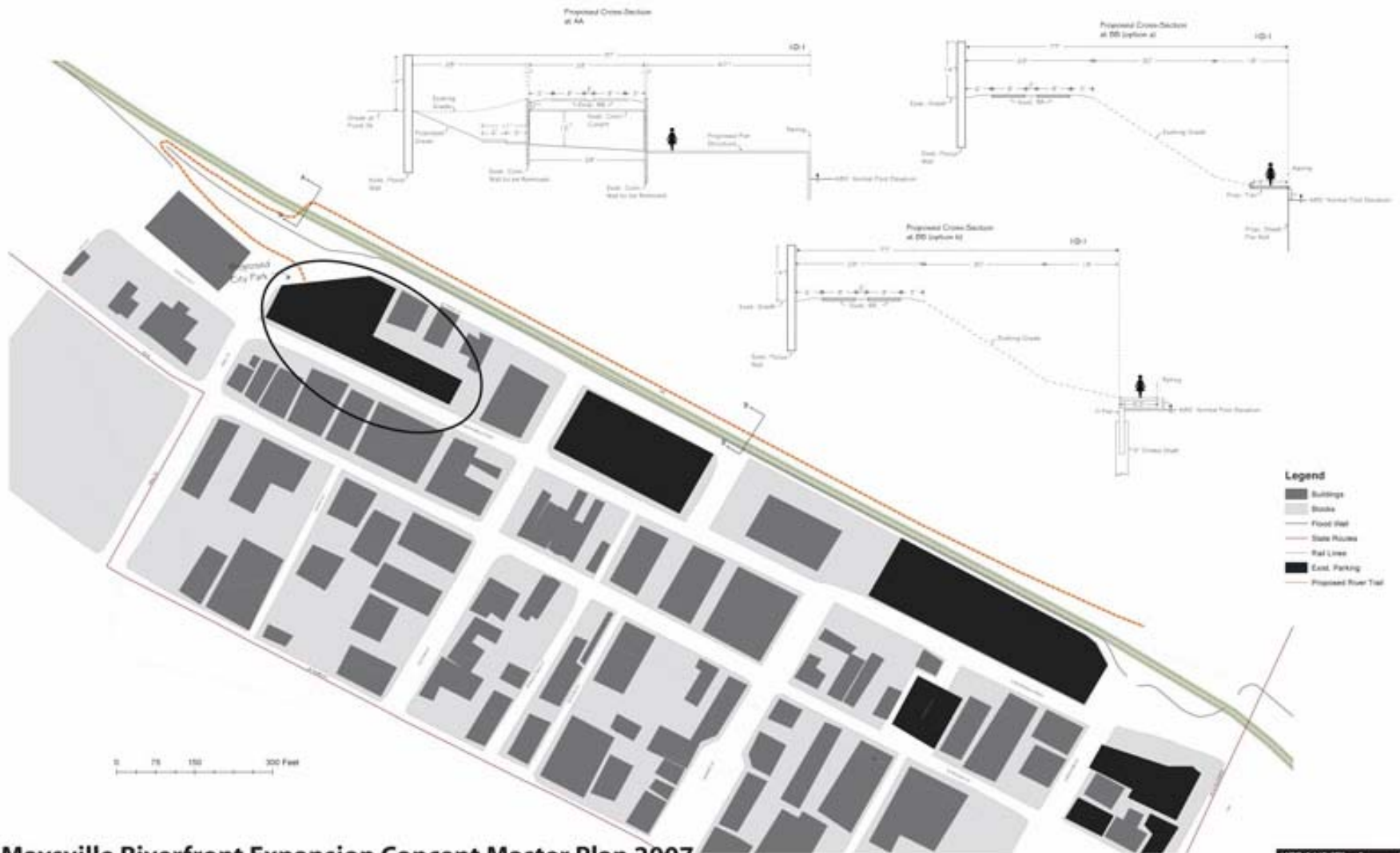


**Handicap Fishing Pier**



**Limestone Landing**

# City of Maysville, Kentucky - Riverfront Expansion

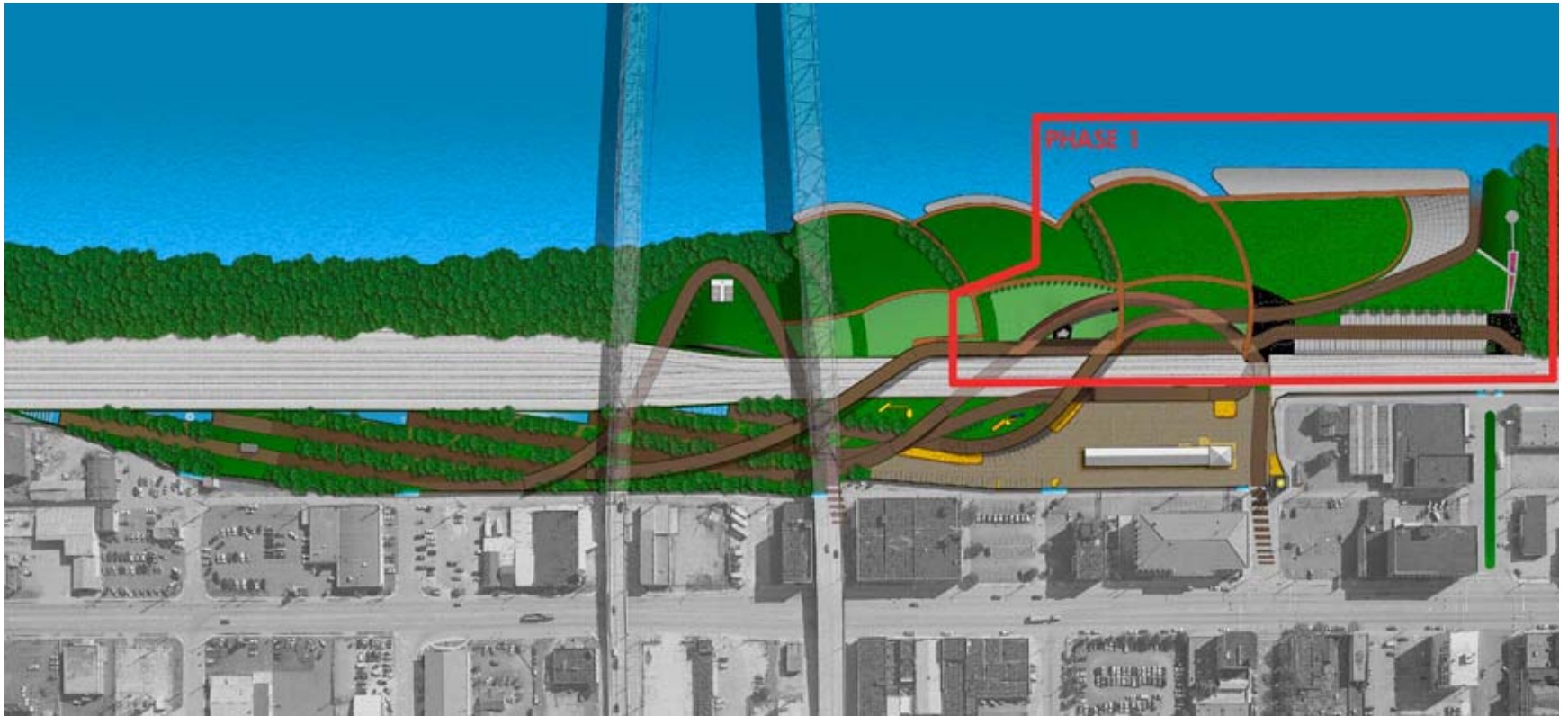


## City of Maysville, Kentucky - Riverfront Expansion



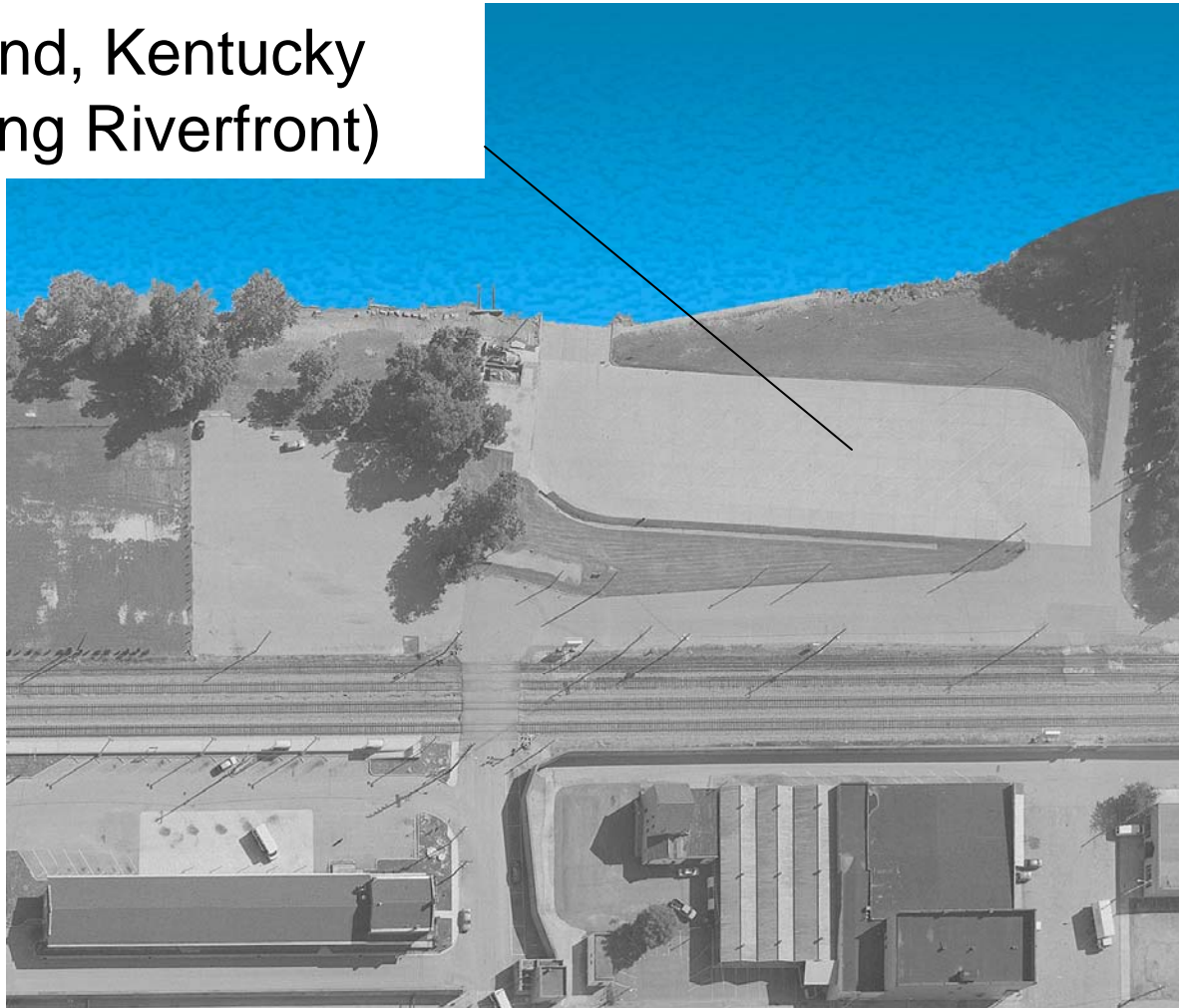
## City of Ashland, Kentucky - Riverfront



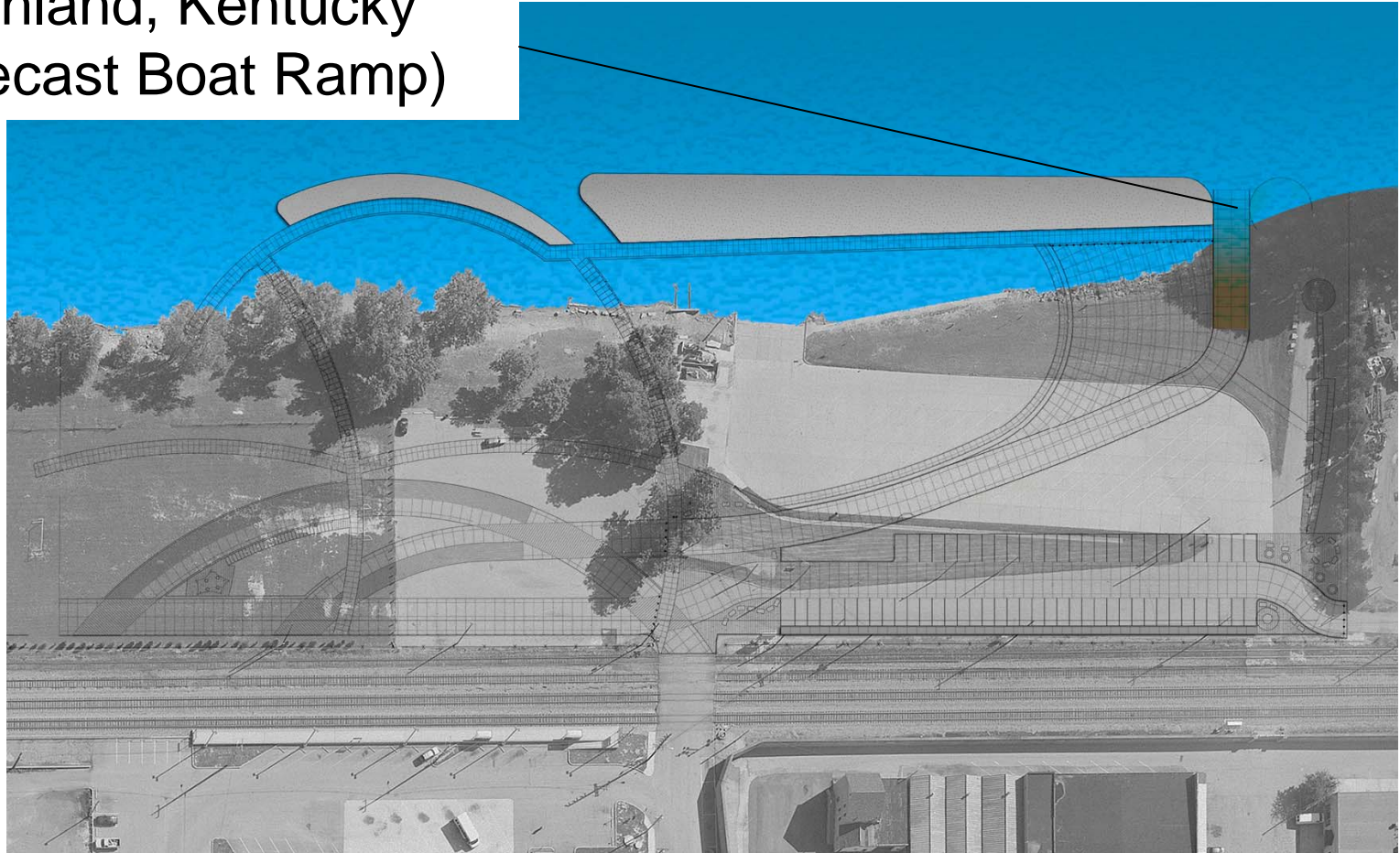


**Phase 1 Related to the Master Plan**

Ashland, Kentucky  
(Existing Riverfront)



Ashland, Kentucky  
(Precast Boat Ramp)



## City of Ashland, Kentucky - Riverfront Perspective



# Riverfront Precast Elements

Precast/Prestressed concrete products are used in many different design applications and types of projects:

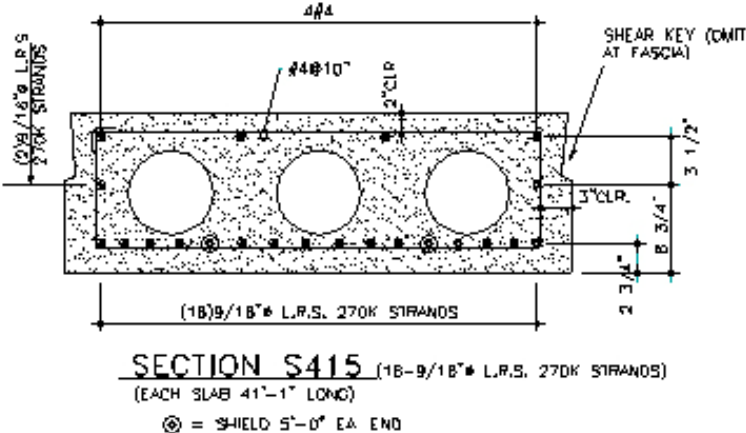


I-girder bridge beams

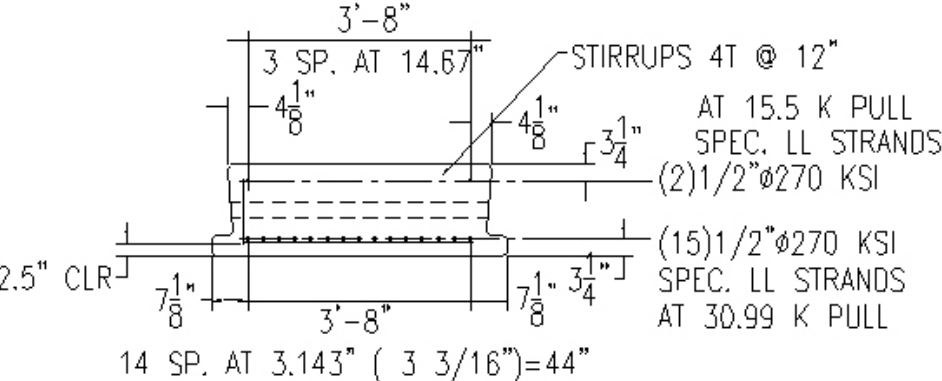


Piles for bridges and buildings

# Precast Usage in Various Applications

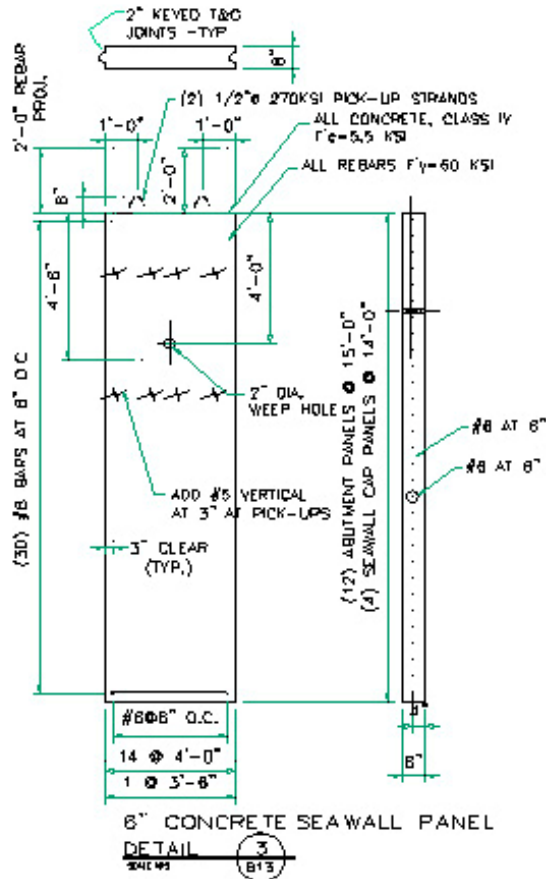


Precast tilt wall panel construction for buildings

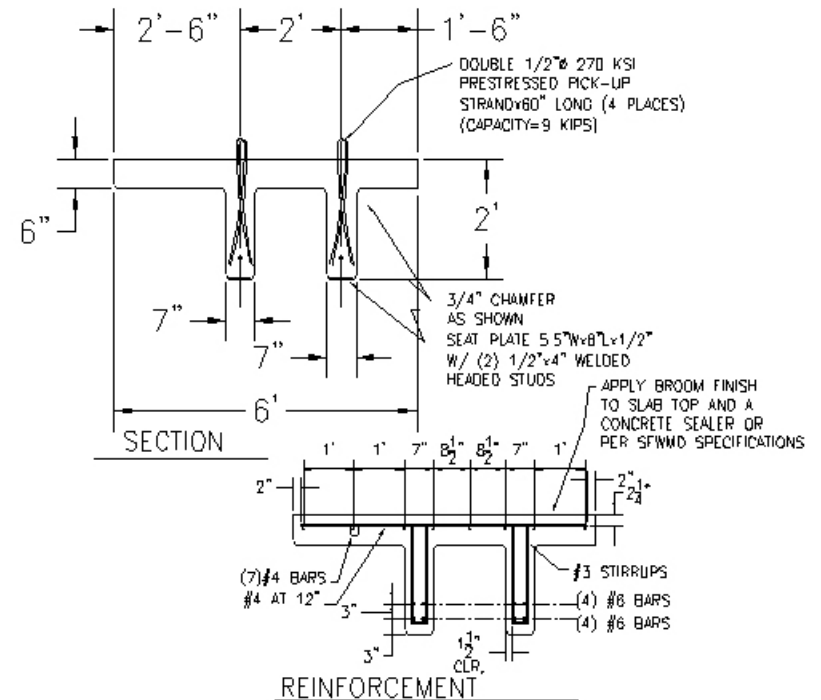


Prestressed/Precast SLAB units

# Precast Usage in Various Applications



Precast seawall concrete panels



Make up your own shapes to fit

- We've shown many of the Different Usages for Precast/Prestressed Products. We will also use these Products in Oceanside, Riverfront, and Lakefront Project Walkways.

- Grade Beams
- Deck Panels
- Boat Ramps
- Piling



Photo provided by Carr Concrete  
Subsidiary of R.W. Sidley, Inc.



# Riverfront Design Considerations

- **Typical Dead Loads**
  - Weight of concrete, railings, curbs, decorative tile, brick inlays, etc.
- **Live Load**
  - Pedestrian walkway loading
  - Crowd/event overloading conditions
  - Emergency vehicle access and/or maintenance vehicle loading

- **Wind Loads**
  - Depends on specific location
- **Seismic Loading**
  - Depending on location of construction
- **Uplift Considerations**
  - The waterways and rivers can have several major fluctuations in water elevations throughout the year, therefore uplift has to be considered

- Debris Impact
- Ice flows, wave impact, current flows, river flow water pressure depending on location
- Scour depth on precast/prestressed piling if used



- Serviceability

- Deflection limit ...

- Should be reviewed in reference to finish top, ie: ceramic tile, etc..

- Span lengths ...

- PCI Design Handbook gives span data table to estimate panels.

- Slip resistance surface finish ...

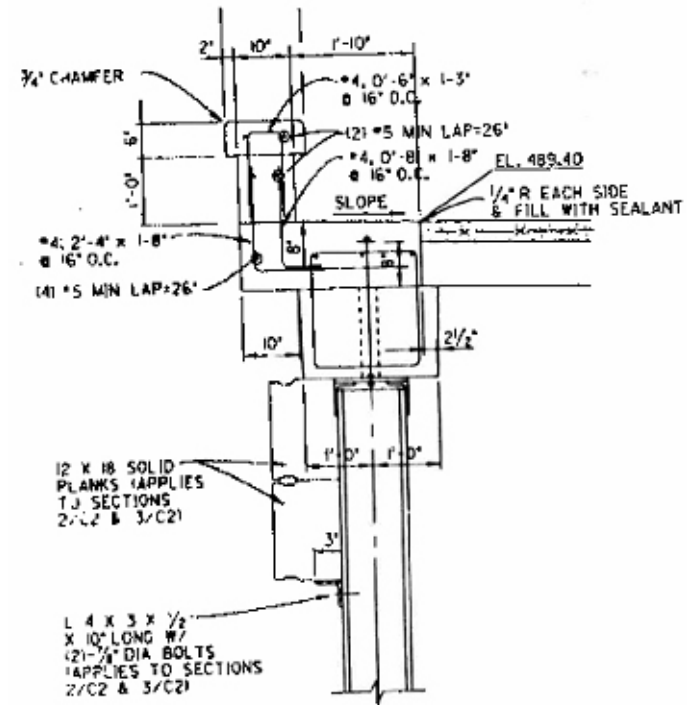
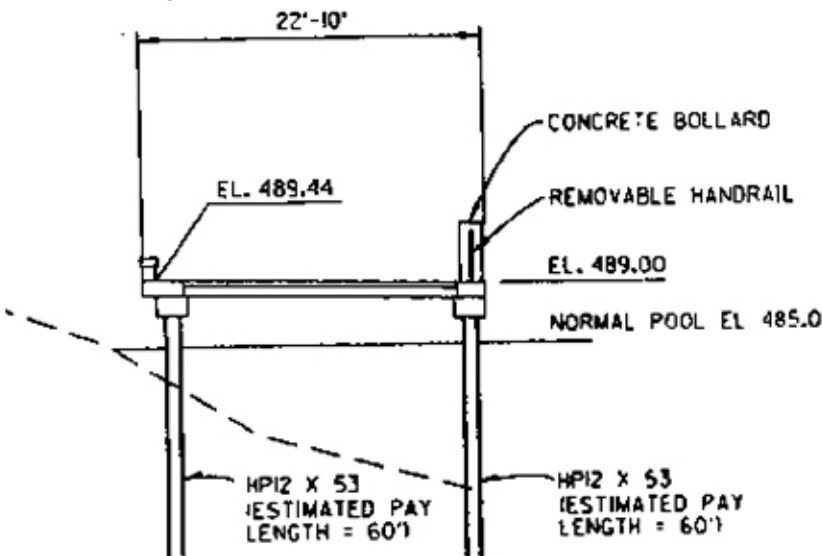
- Normal Broom finish will work in Most applications.

- Long-term performance and environmental conditions
  - Durability, Cover, HPC
- Surcharge roadway loading and railroad surcharge proximity Loading (if applicable)
- Engineering and Design:
  - Engineers, designer's, and precaster's can use one of the numerous commercial available computer programs for the design of the precast/prestressed elements

- Additional loadings to consider include large boat and mooring tie-off loads:
  - Details must be known about the large boats being docked.
  - Using known water flow rates, wind Pressure, boat geometry, and the number of tie-off points, tie-down loads are calculated. These tie down loads are usually transferred to bollards, cleats, or posts which are connected to the concrete slabs through embedment plates.

# Riverfront Precast Details

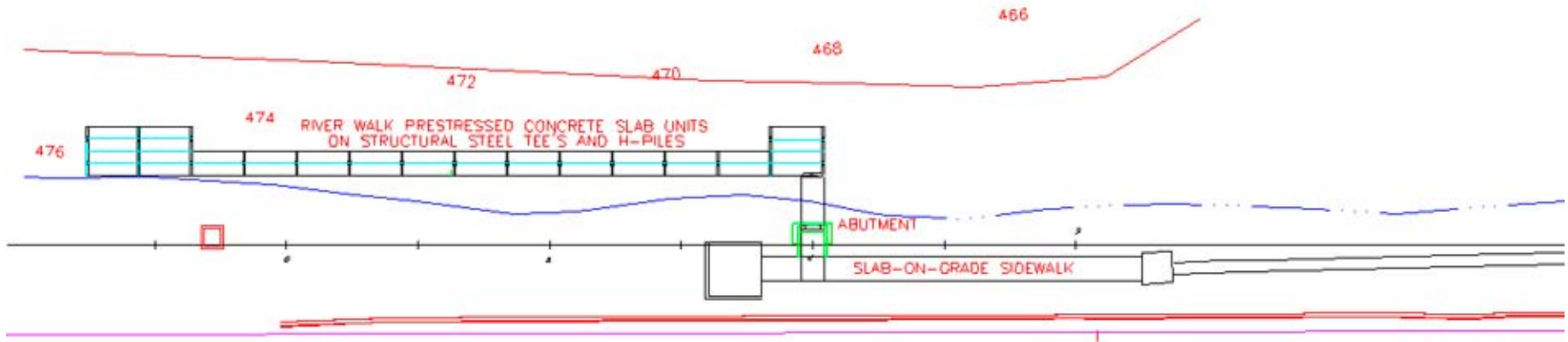
## Handicap Fishing Pier



Piling can be:  
H Piles, or  
precast square piles

Pile Caps usually CIP concrete -  
Precast caps can be used  
to speed construction

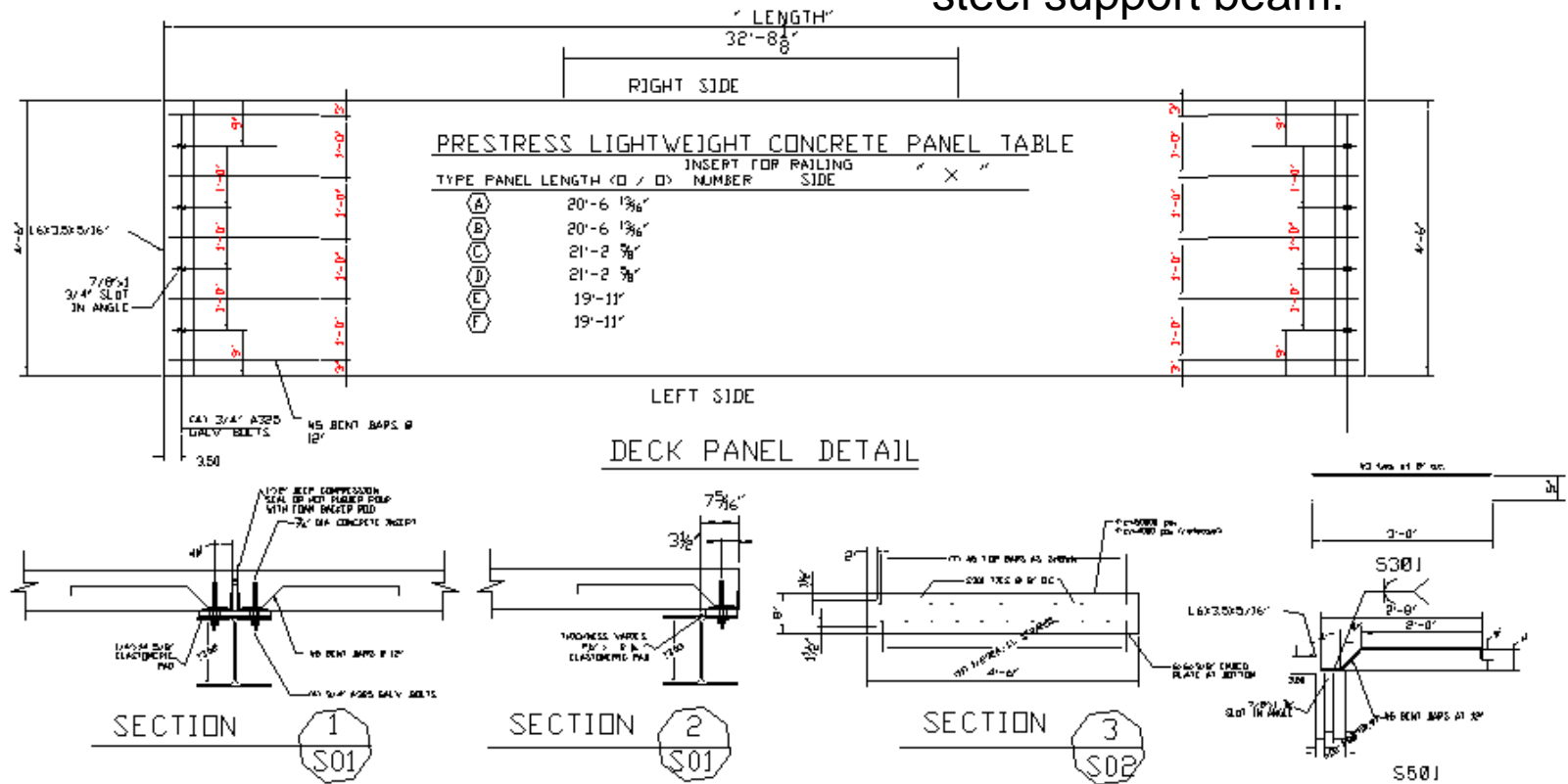
## Riverfront Expansion Project



Simple slab layouts are usually preferred for economics. Scenic build-outs/bump-outs are easily accomplished with extension of pile caps and piling.

# Riverfront Expansion Project

This example uses concrete bolt inserts, and CIP bearing seat angles for attachment to a steel support beam.



- Construction Method Used (non-saltwater environment)  
Precast/Prestressed Concrete Slabs on steel piling and support beam:



# Riverfront Expansion Project

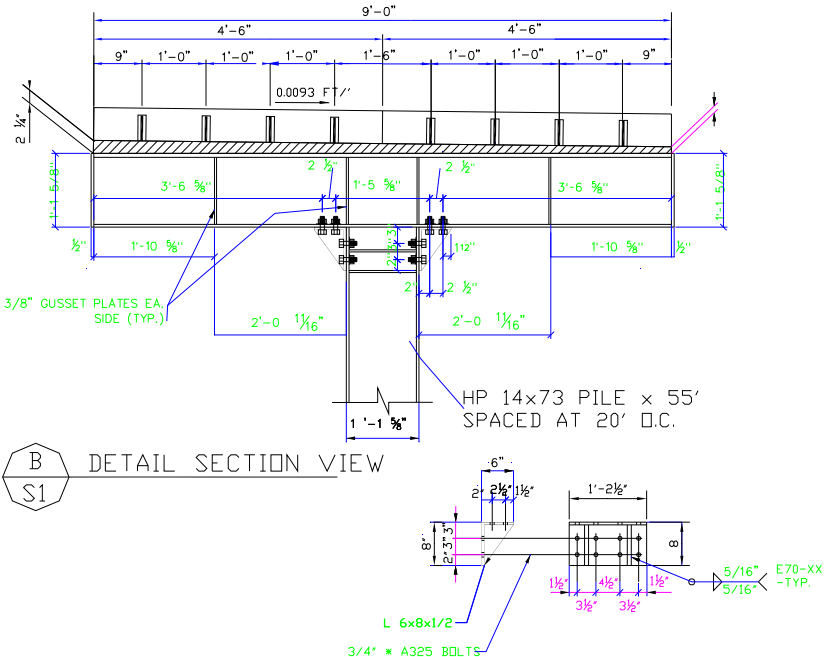
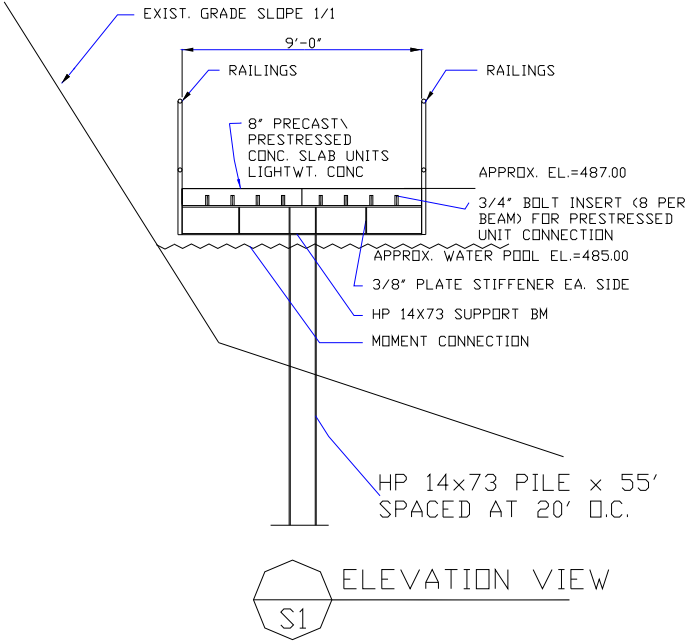
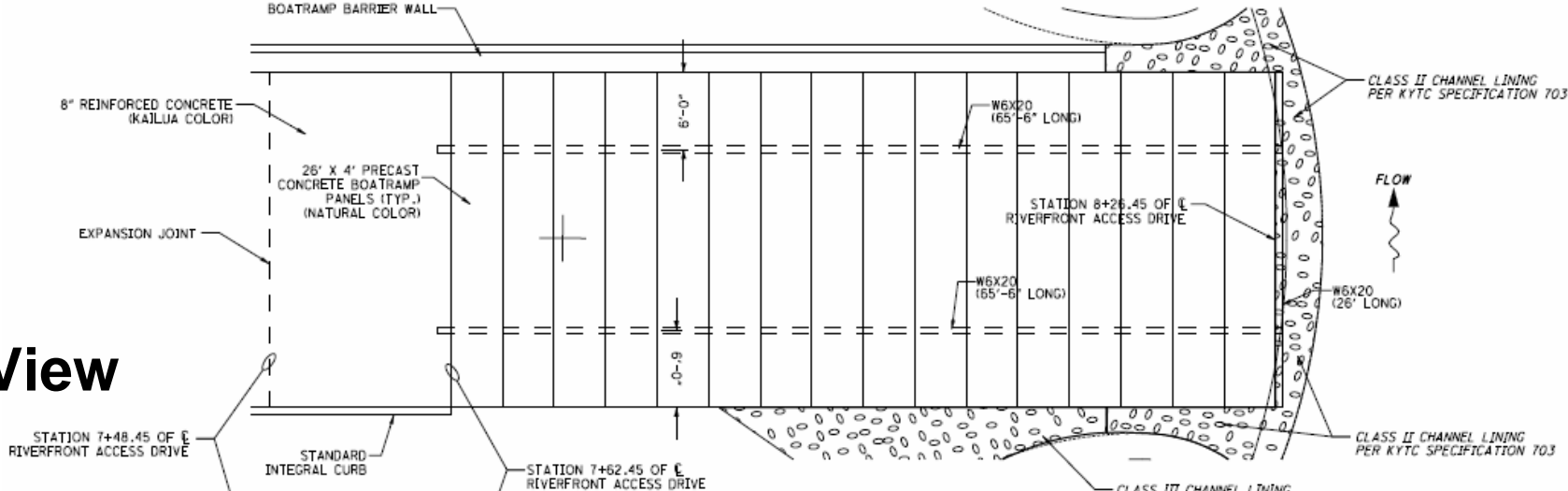


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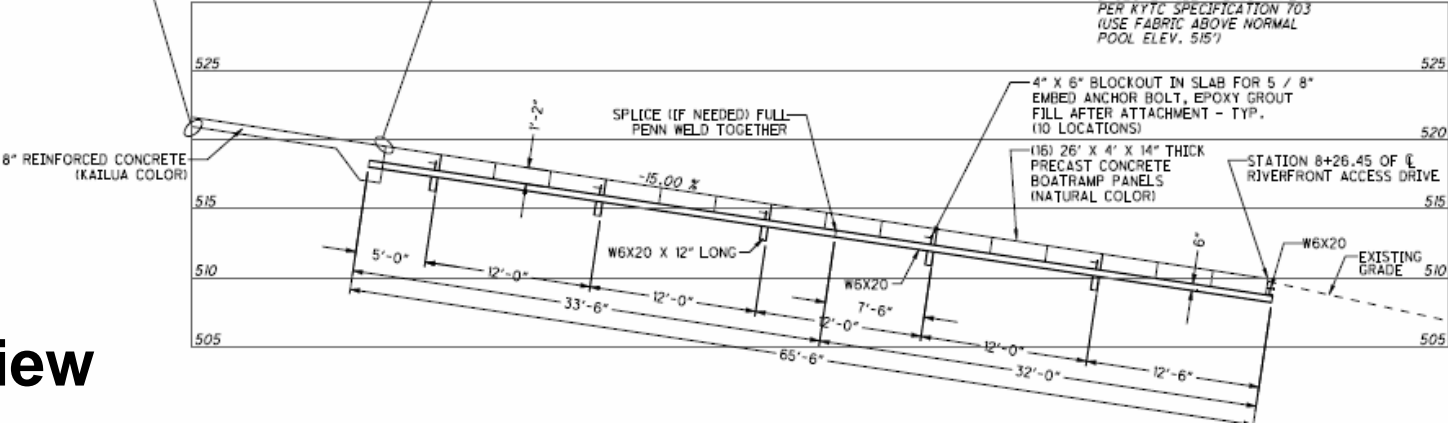


# Precast panels used for the Boat Ramp

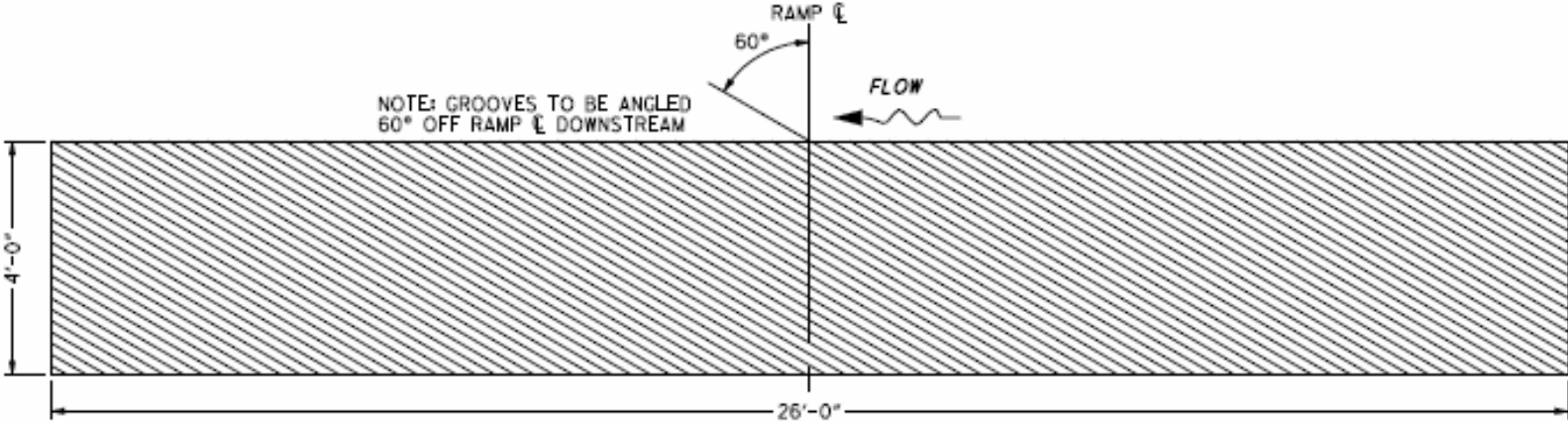
## Plan View



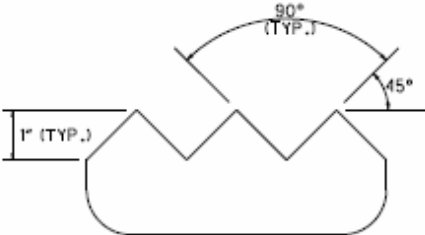
## Profile View



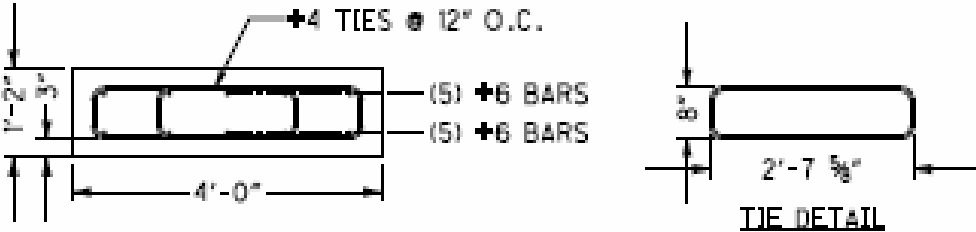
# Slip-resistance grooved details were incorporated into the Precast Panels



PRECAST CONCRETE BOATRAMP PANEL - PLAN VIEW



PRECAST CONCRETE BOATRAMP PANEL - GROOVE DETAIL



14" X 48" X 26'-0" LONG CONCRETE PANELS

# **Why Use Precast for Riverfront/Lakefront Projects?**

## Why Use Precast for Riverfront/Lakefront Projects?

- Speed of construction
- No on-site forming
- Eliminate costly use requiring dewatering for in-situ concrete
- Long-term performance
  - Enhanced durability
  - Maximize Life Expectancy
- Material of choice and ease of use
  - Ease of storage
  - Ease of transport, lifting, and erection
- Design Solutions



## Questions?

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