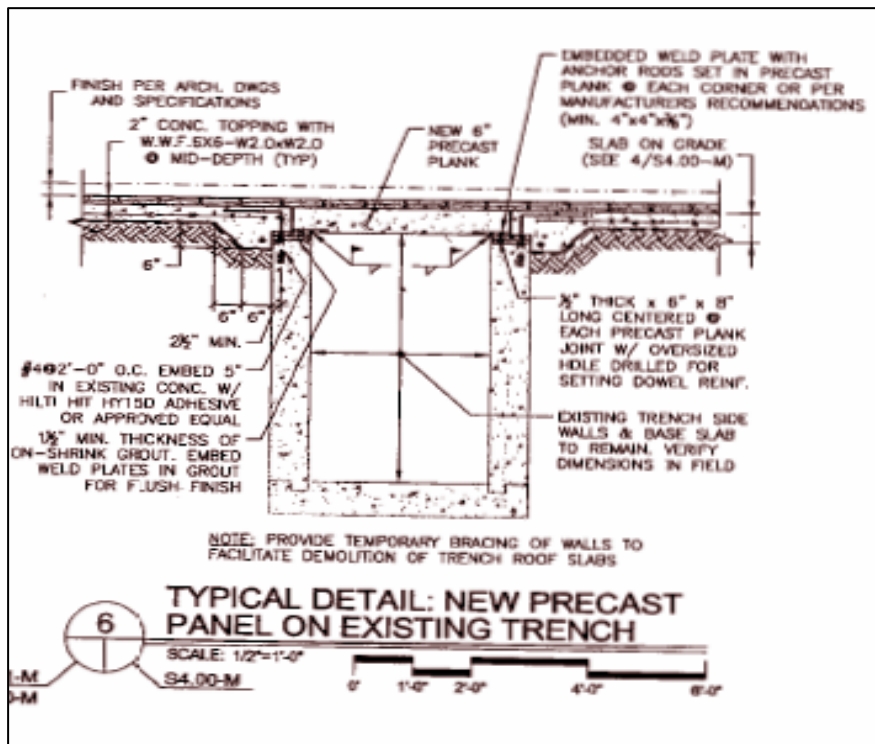


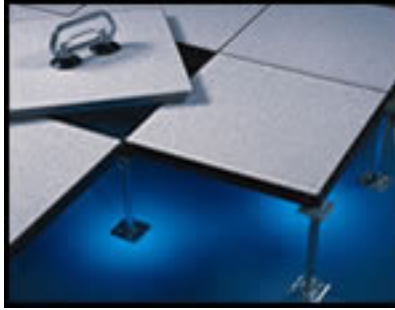
## Change Plank and Slab System to Recessed Flooring

**Issue:** The Virginia Capitol project is being called a “100 year renovation.” The project team is trying to achieve a building that will not need a major renovation overhaul for at least 100 years. The utility tunnels in the Capitol exist under the first floor slab on grade. The current tunnels are made out of concrete, sealed with a precast planks, and then a 2 inch topping slab is placed over the precast. The utilities that are being placed in the tunnels are going to be congested and due to ever-growing technology, this system does not allow ease of updating the structure. The figure, shown below, is a section cut of the current system.



Detail of current trench system. New system would have access flooring in lieu of precast and topping slab

**Proposal:** A value engineering idea would be to use a recessed computer flooring system that would allow for easier access to the utility tunnels as well as ease of installation. The type of flooring that was considered for this proposal was the RWC Series Access Panel, which is made by Maxcess Technologies. The RWC Access Panels are resistance-welded, concrete-filled steel panels that are designed to accommodate high loads. Each panel has an epoxy coated finish for a protective surface.



Example of RWC Access Flooring (Maxcess Website)

**Results:** The proposed system has similar time and cost results as the precast plank and topping slab system. Therefore; the recessed flooring system should be used due to the future expansion and constructability benefits that this flooring brings to the structure. The advantages and disadvantages of the proposal are described below.

▪ **Time**

The precast and topping slab system would take three days to complete (1 for the precast planks and 2 for the topping slab). The recessed flooring would take 5 days to install.

▪ **Cost**

- Precast Planks and Topping Slab
  - ✓ Excluding Trench System: \$23,000
- RWC Access Flooring
  - ✓ Excluding Trench System: \$26,600

▪ **Labor - Number of crew members needed**

	Plank and Slab		RWC Flooring
	Planks	Slab	Access Flooring
Daily Labor Hours	72	88	16
# of days to complete	1	2	5
<b>Total Labor Hours</b>	248		80

As described in the previous analysis, labor is a big issue for the Richmond area. The recessed flooring system would only require two carpenters to install, where as the plank and slab system requires a much larger concrete crew to erect.

▪ **Constructability and Installation**

The recessed floor can easily be constructed in the large spaces that exist in the Capitol Building. The areas are large enough to install the flooring as well as having a material storage area nearby. The constructability may be easier then the precast planks because the precast planks would require more structural support then the recessed flooring and the planks would be larger than the 2' x 2' sections of access flooring.

Since this building is being called a 100 year renovation, it needs to adhere to future expansion. The technology and systems used in this building at the present time will most likely become outdated in the future and new wires and conduit will need to be placed in the tunnel system. The recessed computer flooring will allow for easy access to the utility tunnels and this will allow for easy future expansion.

▪ **Strength and Durability**

The precast planks with the topping slab would be very durable. To try to match this durability, the RWC 300 was picked from the table below. This should help make this flooring’s strength and durability stand up to the 100 year renovation that is trying to be reached.

**RWC Series Panels**

**P e r f o r m a n c e   C h a r t**

PANEL	RWC100	RWC200	RWC300	RWC400	RWC500
APPLICATIONS	Light Duty	Standard Duty	Medium Duty	Heavy Duty	Industrial Duty
STATIC LOADS					
Ultimate Load (lbs)	4000	4800	5400	6400	10,000
Concentrated at 0.10 Deflection	1000	1250	1500	2000	2500
Concentrated at 0.08 Deflection	800	1000	1250	1500	2000
IMPACT LOAD (lbs)	175	175	175	200	200
ROLLING LOADS					
10 Pass	1000	1000	1250	1500	2000
10,000 Pass	600	800	1000	1200	1800

→ Option #1

Performance Chart taken from Maxcess Technologies website

▪ **Quality**

According to Maxcess Technologies website, the RWC Series panel is their premier product line. This system can accommodate very high loads and the protective epoxy finish should protect the flooring from wear and tear.



Example of concrete filled steel panels (Maxcess website)

*Table of Results:* The following table compares the advantages and disadvantages of the two proposed systems. The cost and time factors are relatively similar, but the labor hours and future expansion factors are to the access flooring's benefit. Therefore, the RWC access flooring system would be the best method of construction for this project.

	<b>Recessed Computer Flooring</b>	<b>Precast Planks and Topping Slab</b>
<b>Cost</b>	\$26,600 plus trench cost	\$23,000 plus trench cost
<b>Time</b>	5 days	3 days
<b>Labor Hours</b>	248	80
<b>Future Expansion</b>	Allows for easy access and extensive future expansion	Access would be difficult. Would involve the use of crane or lift system
<b>Installation</b>	Easy installation. Pieces can be stored in the building.	Planks are difficult. Topping slab requires time for curing and setting up.
<b>Quality</b>	High quality access floor with protective finish	Durable and strong