



# Marion County Courthouse Square Structural Remediation Project Summary

October 26, 2010



# TEAM MEMBERS

## MARION COUNTY

*Building Owner, Client*

## SERA ARCHITECTS

*Project manager and team coordinator  
Building assessment  
Sustainability Resources  
Interior Design*

## MILLER CONSULTING ENGINEERS

*Structural engineering*

## RDH BUILDING SCIENCES

*Building envelope and waterproofing*

## PSI

*Material Testing*

## SALEM KEIZER TRANSIT DISTRICT

*Building Owner, Client*

## FORTIS CONSTRUCTION

*Construction Manager, General Contractor  
Cost Modeling, Constructability Review*

## PAE CONSULTING ENGINEERS

*Mechanical, Electrical, Plumbing engineering*

## H&A CONSTRUCTION

*Cost Modeling, Constructability Review*

## GEODESIGN

*Geotechnical engineering*

## DAVID EVANS & ASSOCIATES

*Building Survey*

## CARLSON TESTING, Inc.

*Material Testing*



# PROGRESS REPORT - PAST

To get to our July 26, 2010 Presentation the team:

- Conducted thorough, methodical and efficient investigations broken out by team member.
- Determined that the building and transit mall had enough significant structural deficiencies which required an efficient relocation of building personnel.
  - Punching Shear
  - Concrete Strength
  - Inadequate gravity load capacity
- Through geotechnical analysis; determined that there were no settlement issues associated with sub-grade deficiencies or foundations.
- The geotechnical firm did not find any evidence of an underground river or creek.
- The buoyancy plugs appear to be installed and working as intended.
- The differential settling between the building and the sidewalk is a result of the sidewalk being built over an inadequately compacted fill.



# PROGRESS REPORT - PRESENT

Following our July 26, 2010 Presentation the team:

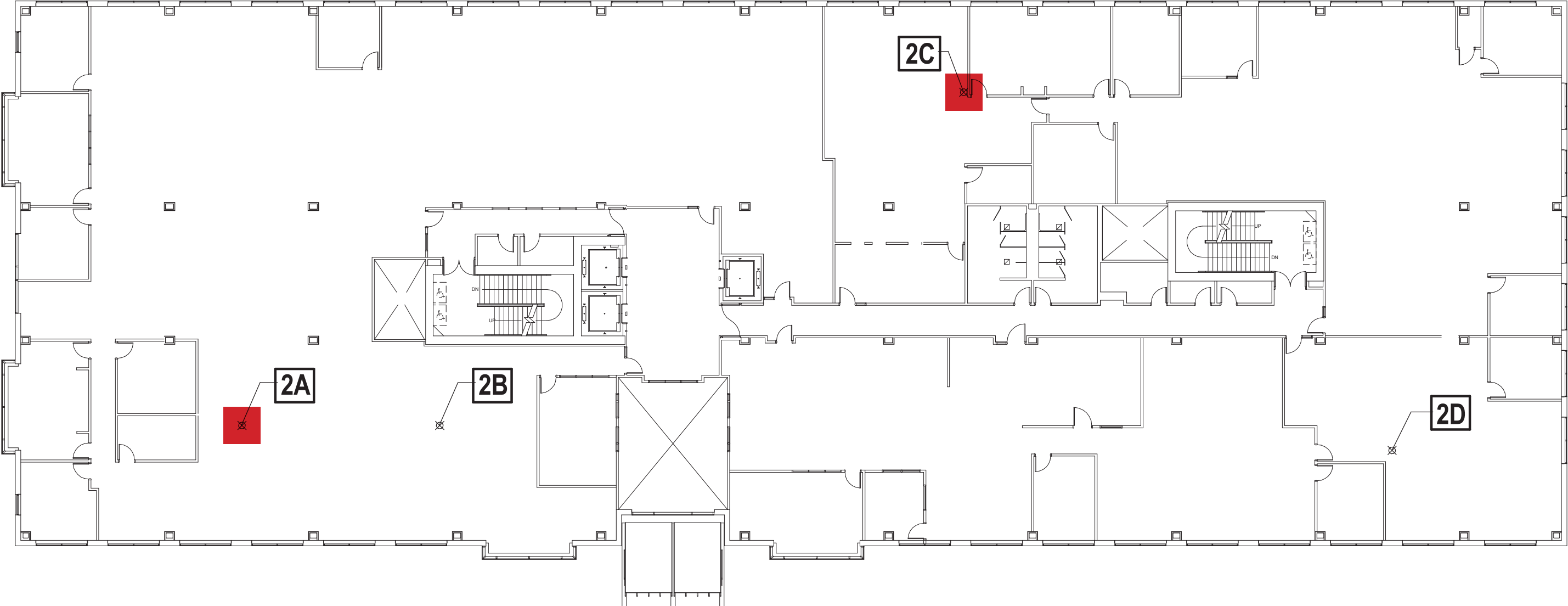
- Determined we may need a materials scientist to augment the investigation.
- Generated a number of building remediation scenarios and are proposing a few of those for further development (see executive summary for other options)

BUILDING	BUS MALL	NORTH BLOCK	OVERALL
Demolish existing building to bare land	Demolish to bare land	Demolish to bare land	Demolish to bare land
Minimum remediation for occupancy	Open top / parking below	Eliminate hazard	Convert entire building to parking + add new transit and MC office and other partners on current property
Replace / Repair for 100% intended use	Transit on top / no parking below		
	Replace / Repair for 100% intended use		

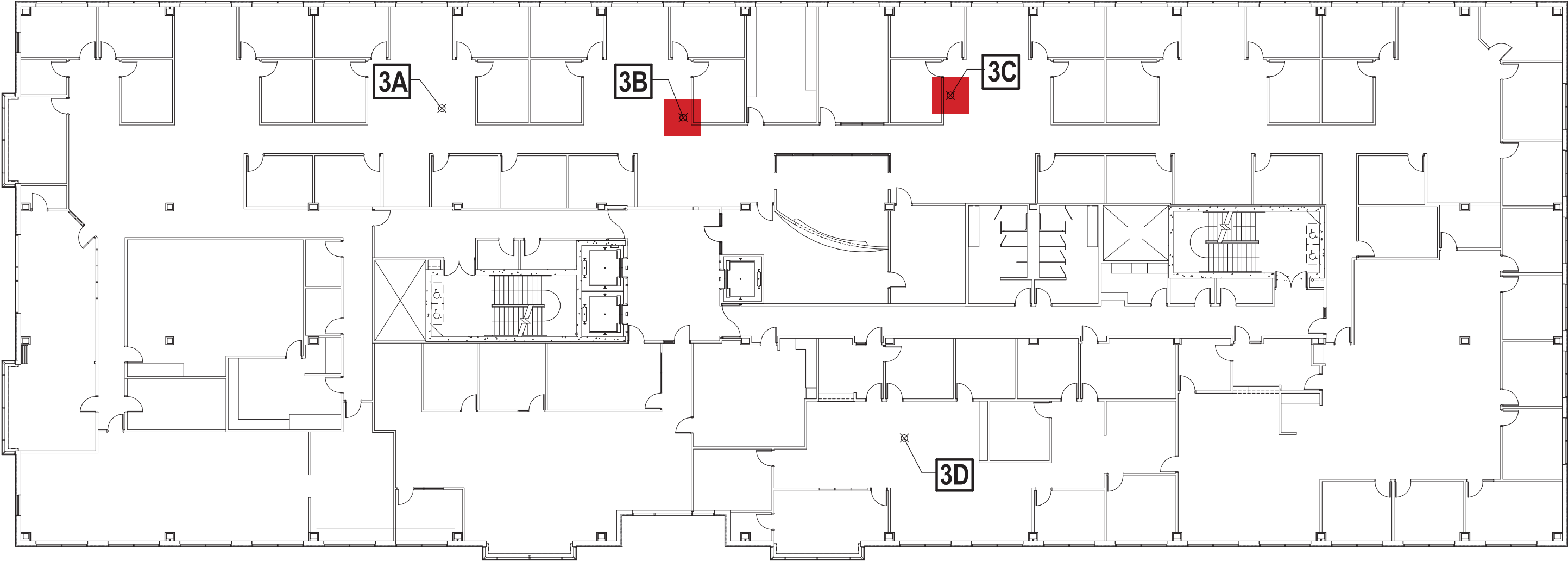
- Working to provide a cost estimate for the full demolition of the building.
- Brought on another 3<sup>rd</sup> party materials testing firm (PSI) to do an independent analysis.

Here are the current test results from PSI and their comparison to Carlson Testing, Inc.:

# Testing Locations - Second Floor



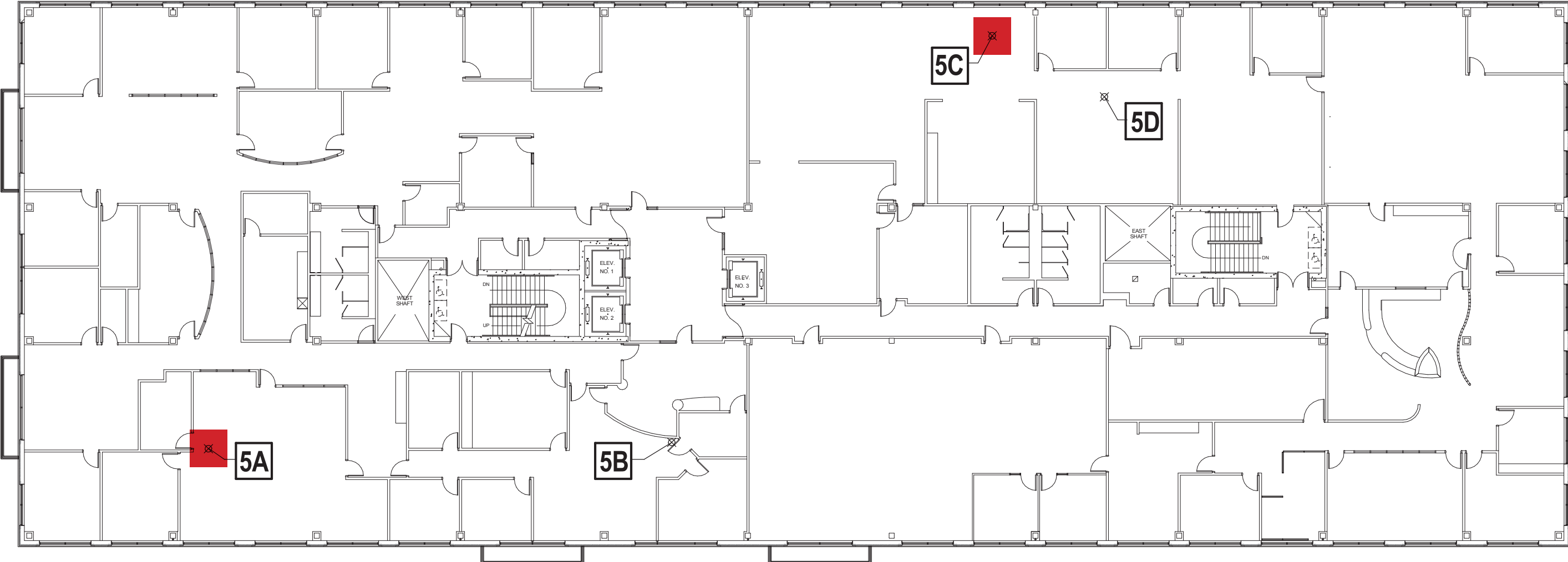
# Testing Locations - Third Floor



# Testing Locations - Fourth Floor



# Testing Locations - Fifth Floor



# Concrete Compressive Core Strength Test Comparison

		<b>Carlson</b>	<b>PSI</b>
Testing Locations		lbs/in <sup>2</sup> (psi)	lbs/in <sup>2</sup> (psi)
Fifth Floor	5A-2	5150	4360
	5A-3		4240
	5C-1	4520	3690
	5C-2		3680
Fourth Floor	4B-1	3730	3480
	4B-2		3810
	4C-1	4860	4020
	4C-2		4600
Third Floor	3B-1	3490	3330
	3B-2		3480
	3C-1	3800	3600
	3C-2		3620
Second Floor	2A-2	3460	3040
	2A-3		3770
	2C-1	3710	3270
	2C-2		3360



# Petrographic Test Comparison

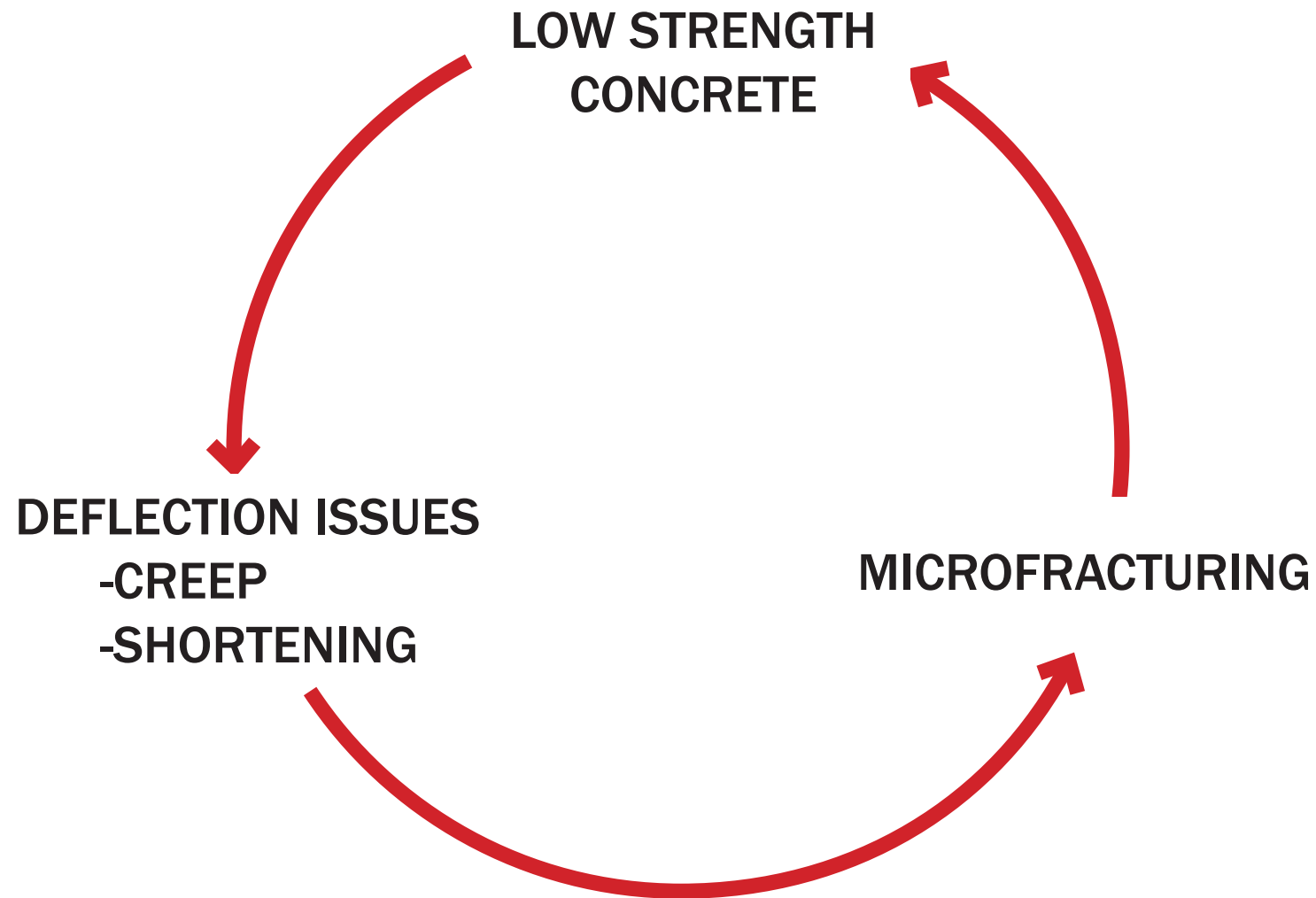
Carlson	PSI
<p style="text-align: center;"><b>4 - 6%</b> VOIDS</p>	<p style="text-align: center;"><b>1.25 - 1.4%</b> VOIDS</p>
<p style="text-align: center;">Indicating <b>high</b> void content concrete</p>	<p style="text-align: center;">Indicating abnormally <b>low</b> void content concrete</p>
<p style="text-align: center;"><b>3%</b> voids is the average standard for concrete</p>	



# Water:Cement Ratio Test Comparison

Carlson	PSI
<p style="text-align: center;"><b>NORMAL</b> WATER TO CEMENT RATIO</p>	<p style="text-align: center;"><b>HIGH</b> WATER TO CEMENT RATIO</p>
<p style="text-align: center;">Indicating a Stiffer/<b>Stronger</b> Mix</p>	<p style="text-align: center;">Indicating a More Workable/<b>Weaker</b> Mix</p>

# Micro-fractures in the Concrete



Carlson	PSI
MINIMAL	EXCESSIVE
<p>Excessive Micro-fractures would tend to indicate overstressed concrete and a potential for leading to in place concrete strength degradation. <b>(It gets weaker.)</b></p>	



PHOTOGRAPHS



Photograph #1 - Sample 06033-1. Change in paste color can be seen at top surface and lower right corner.



Photograph #2 - Sample 06033-2. Color change can be seen in paste at top surface as well as the bulk paste.



# PROGRESS REPORT - FUTURE

## The Next Steps:

- Work with the respective Boards to determine which options they want the project team to pursue.
- Develop those options to a sufficient level for rough cost estimating and decision making purposes.
- Perform the tendon strength and tension test for use in analyzing the options chosen.
- Present those options and costs to the respective Boards.
- The Boards will then need to provide the project team direction.





# QUESTIONS?



**Cherriots**  
SALEM-KEIZER TRANSIT

MARION COUNTY COURTHOUSE SQUARE & BUS MALL REMEDIATION PROJECT October 26, 2010

