



ULTRA-THIN WHITETOPPING

A beautiful thing when applying these lessons learned...

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- Brett Kesterson, P.E.
- Hollie Berry, Construction Manager
- Steve Townsen, P.E., City Engineer





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Denver Avenue Roadway Repairs

Once Upon A Time....

(pavement work starting in May 2010)

City of Portland Office of Transportation
Plans for Proposed Project
Grading, Drainage, Structures, Paving, Striping, Signing, Illumination, & Roadside Development

N. Denver Ave. Improvements From N. Watts St. to N. Interstate Ave.

Multnomah County
July 2009

INDEX OF SHEETS	
Sheet No.	Description
1	Cover Sheet
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End Of Project
Sta. "D" 11+79.54

Beginning Of Project
Sta. "D" 1+43.61

LOCATION MAP

0 100 200 300 400
FEET

Overall Length Of PWS/SSP - 0.20 Miles

T = 1 N, R = 1 S, W.M.

ATTENTION

Project LHM Roadway Strip to Yellow Phase Addressed by The Oregon Utility Notification System (LHM) for the City of Portland. The City of Portland is required to notify the Oregon Utility System (OUS) of the project location. The telephone number for the Oregon Utility System is 1-800-551-5411. Excavations are required to notify the utility and locate it before work. For more information on excavation, or to contact our 24-hour service line, call 1-800-551-5411 or 1-800-333-2344.

<p>APPROVALS:</p> <p><i>[Signature]</i> <i>[Signature]</i></p>								<p>N. Denver Ave. Improvements From N. Watts St. to N. Interstate Ave.</p> <p>Cover Sheet</p>	



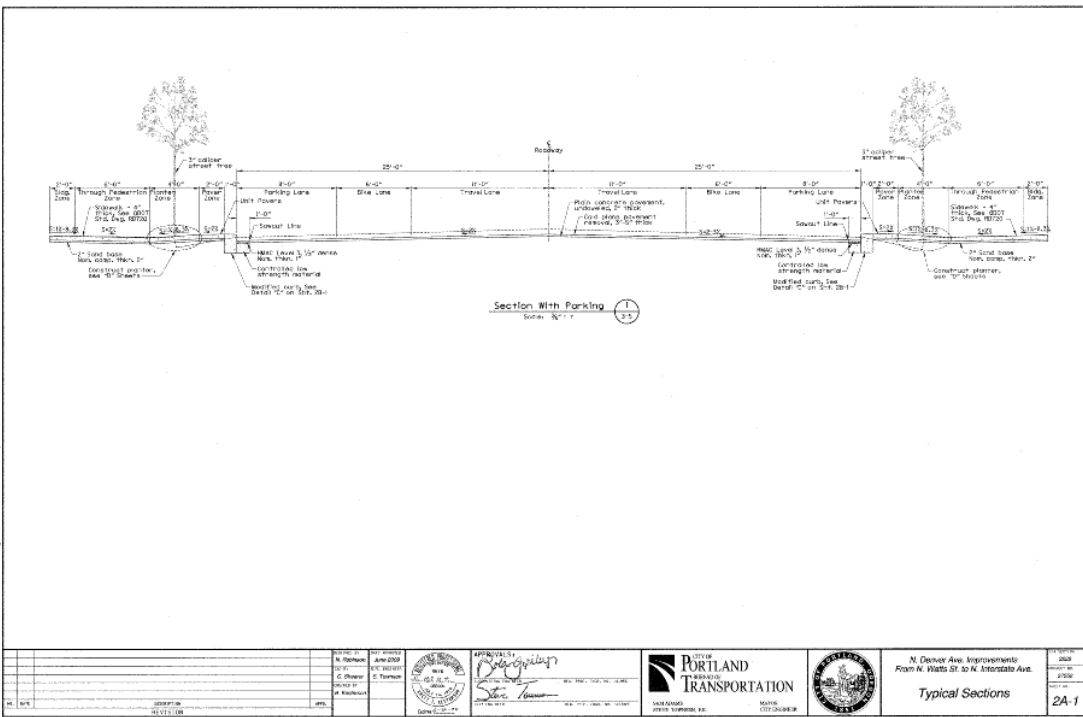
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There Was This Project...



- ✓ Street Improvements to Enhance Commercial District
- ✓ Kenton Business District Wanted a Unique Look
- ✓ Removed top 3" to 5" of asphalt by cold planing
- ✓ Added back 2" of UTW



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And the Ultra-Thin Included...

- ✓ 5,000 PSI Concrete
- ✓ Fiber Reinforcement
- ✓ Industry Standard Quality Control Measures

Also....

- ✓ The Pavement Cores Showed 6" to 8" of Hassam Concrete
- ✓ Leveling Course of AC was added to Blocks 2, 3, and 4
for Constructability Reasons





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In the first block.....



***And NOT just at
manholes!***





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Our Two Governing Principles

Spock: This is the new brig, Captain. It is escape-proof.

Kirk: How do you know?

Spock: The designers tested it using the most intelligent and resourceful person they could find. He failed to escape.

Kirk: This person didn't by any chance have pointed ears and an unerring capacity for getting his shipmates into trouble, did he?

Spock: He did have pointed ears.

-Star Trek V: The Final Frontier



“Insanity is doing the same thing, over and over again, but expecting different results.”

– Albert Einstein





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DESIGN KERNELS OF KNOWLEDGE

#1 Existing Underlying Pavement

- Determine if pavement is adequate for current traffic.
- UTW does not strengthen pavement section.
- If adequate for load, replace with a durable material.





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DESIGN KERNALS OF KNOWLEDGE

#2 If Concrete Slab Has Been Overlaid

- Remove all AC to PCC.
- Install Minimum 1" AC Bond Breaker
- Why a bond breaker?





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DESIGN KERNELS OF KNOWLEDGE

#3 If Concrete Slab Has Been Overlaid



REMEMBER Trench Repairs if Concrete Was Not Used.

Uniformity in Concrete Pavement Section is Key.



Remove Soft Spots



Then Fill





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DESIGN KERNELS OF KNOWLEDGE

#4 – Thickness of UTW

- UTW is typically 2” to 4”
- If only passenger vehicles, 2” will probably work.
- If bus or trucks, use 3” to 4” depending on loading.





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DESIGN KERNELS OF KNOWLEDGE

#5 –Scoring

- ❑ Scoring based on thickness of UTW.
 - 2” Thick, 2’ x 2’
 - 3” Thick, 3’ x 3’
 - 4” Thick, 4’ x 4’





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DESIGN KERNELS OF KNOWLEDGE

SUMMARY

- Adequate Existing Pavement Section
- Minimum 3" UTW
- 1" Minimum Bond Breaker
- Uniform Existing Pavement (trenches/patches)
- Scoring Maximums





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CONSTRUCTION KERNELS OF KNOWLEDGE

(Where the concrete hits the pavement...or the pavement hits the concrete....)

#1 A Solid Foundation Is Crucial

- Trolley tracks in the subgrade – remove them.**
- Include allotment for subgrade correction in original bid.**



What happens when you don't have a solid foundation?





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#2 Don't ASSUME the Subgrade

- Include allotment for subgrade correction in original bid.
- Include pavement core/boring data in the bid docs.





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CONSTRUCTION KERNALS OF KNOWLEDGE

(Where the concrete hits the pavement...or the pavement hits the concrete....)

#3 The Value of the Leveling Course

- The value canNOT be underestimated. Period.





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CONSTRUCTION KERNELS OF KNOWLEDGE

#4 Trench Backfill Standards

- ❑ Replace subgrade in kind, especially **CONCRETE**.
- ❑ Common issue for utility trench backfills.





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CONSTRUCTION KERNELS OF KNOWLEDGE

(Where the concrete hits the pavement...or the pavement hits the concrete....)

SUMMARY

- A Solid Foundation is Crucial**
- Don't ASSUME the Subgrade**
- The Value of the Leveling Course**
- Trench Backfill Standards**



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Thank you for listening to our tale.

It's not often that we have the opportunity to share our lessons learned. That is with an audience like you (not held captive).

May your next ultra-thin concrete experience be well supported by a sturdy subgrade and with a good leveling course!

