CLAY BRICK PERVIOUS PAVEMENT
CASE STUDY
CITY OF NEW ALBANY

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Travis Eifert, PE, LEED AP
Doug Turney, PE, CFM, LEED AP

EMH&T
STORMWATER MASTER PLAN
VILLAGE CENTER STREETSCAPE CONCEPTS

- Development of Historic Center and Village Core
- Pedestrian experience and accessibility
- Design of streets and public places
- Amenities
CITY EVALUATION CRITERIA

- Aesthetics consistent with Historic Village Center
- Third Street must be reconstructed
- Options explored
  - Overlay (Not Possible)
  - Spot repair (Not Possible)
  - Full depth reconstruction (Standard Section)
  - Reconstruction with considerations for future developments
- Stormwater requirements
  - Incentives for redevelopment
THIRD STREET: CONCEPT PLAN
Recommended Solution

- Pervious Pavers
  - Most cost effective
  - Functional
  - Aesthetically pleasing
  - Water quality credits per draft OEPA standards
  - Low maintenance
PAVEMENT SELECTION – CONCRETE OR CLAY?
PERMEABLE INTERLOCKING CONCRETE PAVEMENT

- Solid Concrete (3-1/8”)
- 8,000 psi (avg)
- Can Be Machine Installed
- Can Be Used on Low Volume Streets
- Traffic Calming
- Aesthetic Value
- Life Cycle Cost Savings
CLAY PERVIOUS PAVERS

- 2-3/4” Paver
- 14,000 psi (avg)
- Better Durability
- Less Likely to Fade
- Installed by Hand
- Aesthetic Value
- Traffic Calming
- Can Be Used on Low Volume Streets
- Life Cycle Cost Savings
Ohio Permeable Clay Paver Manufacturers:
Whitacre Greer – Alliance
Belden Brick - Canton
Traditional Street Full Depth Replacement
Excavation, Street, Pavement  $191,364
Storm Sewer/Water Quality Unit  $107,990
10 year Maintenance (mill & pave)  $ 18,597
Street & Storm Total:  $317,951
Project Total:  $426,052

Clay Pervious Paver Full Depth Replacement
Excavation, Street, Pavement  $268,822
Storm Sewer/Water Quality Unit  $ 42,152
Totals:  $310,974
Project Total:  $415,851

Winning Bid  $424,389
Clay Paver Section Costs (11,916 sq.ft.)

- Clay Paver Installation Cost: $4.90 sq.ft.
- Clay Paver Material Cost*: $5.85 sq.ft.
- No. 2/No. 57 Aggregate Cost: $3.54 sq.ft.
- Total: $14.29 sq. ft.

*Includes extra 10% for future repairs
How thick does pavement have to be?
Two Geotechnical Borings
- CBR of 4.6 and 8.0
- CBR value of 4.6 used

Traffic Count of 780 ADT

2% Truck Traffic Assumed

Structural Number Required 2.28
- Compacted Base – ODOT 204
- Stone sub-base and pavement layer coefficient of 0.14 used

Required Structural Thickness:
\[ \frac{2.28}{0.14} = 16.3" \]

- Interlocking Pavement Industry uses 0.44 for pavement course

Required Structural Thickness:
\[ 2.75" \times 0.44 = 1.21 \]
\[ (2.28 - 1.21)/0.14 = 7.6" + 2.75" = 10.4" \]
Recommended Thickness of Pavement System

- Pavement + Stone Layer = 0.65 * Frost Depth
  (based on UNH Stormwater Center, 2009)
- Pavement + Stone Layer = 0.50 * Frost Depth
  (based on National Ready Mix Concrete Association)

<table>
<thead>
<tr>
<th>Located North of Latitude</th>
<th>Max. Frost Depth (in)</th>
<th>Min. Recommended Thickness (0.65 x Frost Depth) (in)</th>
</tr>
</thead>
<tbody>
<tr>
<td>38.3 Ironton</td>
<td>24</td>
<td>16</td>
</tr>
<tr>
<td>38.7</td>
<td>26</td>
<td>17</td>
</tr>
<tr>
<td>39.0 Cincinnati</td>
<td>28</td>
<td>18</td>
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<td>39.3</td>
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<td>41.0</td>
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<tr>
<td>41.3 Cleveland</td>
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</tr>
<tr>
<td>41.7 Ashtabula</td>
<td>44</td>
<td>29</td>
</tr>
</tbody>
</table>

Source: Floyd (1978)

* Tentative 12/10
WATER QUALITY VOLUME (WQV)

- Full Infiltration of WQv within 48 hours
  - pre-approval from Ohio EPA not required

- No Infiltration of WQv (lined system or compacted subgrade) drain within 24 hours
  - case-by-case, prior approval required by EPA and MS4

- Partial Infiltration of WQv within 48 hours
  - case-by-case, prior approval required by EPA and MS4

- Redevelopment Projects
WATER QUALITY DESIGN

2 3/4” Pervious Clay
Brick Paver over 1”
Depth No. 8 Agg.

4” Depth
No. 57 Agg.

2.52%

2.1’

9” Depth
No. 2 Agg.

12” Stm.

8” Perforated Pipe

No. 2 Agg.
Storage Basin

8” Perforated Pipe

The Agri Drain Inline Water Level Control Structures
DRAINAGE FROM ADJACENT AREAS

\[ A_{\text{impervious}} < 2A_{\text{pervious}} \]
CONSTRUCTION & OVERSIGHT:
LESSONS LEARNED 3RD STREET
NEW ALBANY

- Use perforated 6” PVC pipe
  - Protect against collapse during compaction
  - Video inspect after compaction to verify integrity
Compaction of Aggregate Layer

- Use 10-15 ton vibratory roller
- Try to eliminate settlement of stone layer
Compaction of Aggregate Layer

- ODNR Recommends Lightly Compacted
- Village of New Albany wanted Full Compaction
NO. 9 AGGREGATE
NO. 9 AGGREGATE SCREED
SIDEWALK SETTLEMENT
ROAD SALT
POST SWEEPING OF NO. 9 INTO VOIDS
AFTER (JULY 2011)
QUESTIONS?

Doug Turney
EMH&T
(614) 775-4213
dturney@emht.com