

# Reuse & Recycling Final Report

*Monona Riverfront Redevelopment  
December 2017 to May 2018*



## City of Monona Owners Rep

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### Facility/Scope of Project

The work included the demolition and site clearance of 4 buildings located at 802 W. Broadway, 6320 Metropolitan Lane, 6406 Bridge Road and 6414 Bridge Road, Monona, WI. The project goal for recycling was 90% (concrete recycling was elected).

### Salvaged Materials

WasteCap conducted a walk through to take an inventory of reusable items in the building, identifying reusable materials and coordinated salvage efforts. The following materials were salvaged for reuse:

#### WasteCap

9/19/17 Salvage Inventory (Bank)		10/30/17 Salvage Inventory (Boat House)	
Item	Quantity	Item	Quantity
Bookshelves	4	Farmhouse Kitchen Sink	1
Door Number Plates	23	Light Fixtures	8
Framing Lumber/8'	4	Knotty Pine Wall Cladding	653 sqft
Shelving/3'	9	Cup Holder	1
4'x8' Plywood Sheets	2	Door Weight	1
Trash Cans	3		
Bike Rack	1	<b>11/28/17 Salvage Inventory (Bar)</b>	
Doors	8	<b>Item</b>	<b>Quantity</b>
Chairs	6	1 x Wall Cladding	351 sqft
Tables	4	2x6x8 Lumber	13
Mail Slots	5	Tables	2
Printers	3	Lights	2
Dentist's Cart	1	Chairs	3
Clock	1	Misc Items	50
Stereo	1		
Lamps	2		
Misc Wood Trim/8'	6		
Chair Mat	1		
Broom	2		
Mop Bucket	1	<b>Total Material Weight - Bank</b>	<b>1,509 lbs</b>
Ash Trays	6	<b>Total Material Weight - Boat House</b>	<b>1,113 lbs</b>
Christmas Trees	2	<b>Total Material Weight - Bar</b>	<b>2,400 lbs</b>

Habitat For Humanity

11/28/17 Salvage Inventory (Bank)	
Item	Quantity
Base Cabinets	36
Upper Cabinets	32
Chairs	14
Misc Items	60
Boxes of Carpet Tile	4
<b>Total Material Weight</b>	<b>3,670 lbs</b>

Sector 67, Madison Area Schools, Individuals

Salvage Inventory (Bar and Boat House)		School and Individual Pulls (all buildings)	
Item	Quantity	Item	Quantity
Security Cameras	3	Small Desks	5
Concrete Picnic Tables	2	Large mirrors (3'x5')	9
Water Booster Tank & Pump	1	Small filing cabinet	1
Door Closer	1	Ceiling Tile and Grid	45
Steel Door	1		
Lights	2		
Air Cleaners	2		
Glass Entry Door	1		
<b>Total Material Weight</b>	<b>1,168 lbs</b>	<b>Total Material Weight</b>	<b>698.75</b>

**Abatement of Hazardous Materials**

Prior to full demolition, asbestos testing was conducted and the abatement of hazardous and regulated materials was completed according to local regulations. For all materials removed during the pre-demolition phase, the demolition contractor provided evidence of proper handling. The abated material did not count for or against the project’s recycling rate.

The following items required abatement and proper disposal:

- 802 West Broadway:
  - Fire and Equipment Room, elevator, and vault doors.
  - Wall panelling, drywall, electrical boxes, sinks, and roofing.
- 6320 Metropolitan Lane
  - Ceiling tiles, windows, exterior metal siding and frames on older portions of the building.
  - Floor tile, carpet and electrical boxes.
- 6406 Bridge Road

- Vinyl flooring, drive through overhang stucco, and roofing.
- Electrical panels and switchgear.
- 6414 Bridge Road
  - Roofing, electrical boxes, drywall.

**Waste Diversion Results**

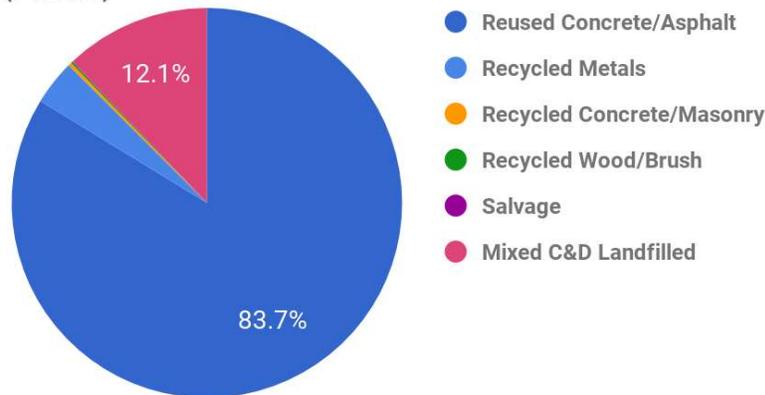
The demolition contractor was required to ensure that all documentation of recycling and disposal was given to WasteCap. This was added to the information gathered from all salvage efforts and combined to produce the final report.

- The vast majority of concrete and asphalt were crushed and reused on site. A small quantity was recycled.
- Metals were recycled.
- A small amount of wood and brush from the clearance of the site was sent for chipping.
- Reusable materials were salvaged.
- The remainder went in a commingled dumpster landfilled at Madison Prairie.

The floor area of the demolished buildings was 133,800 square feet, and site paving to be removed totaled around 300,000 square feet. Total waste generated on this project was 14,699.69 tons (~68 pounds per square foot of demo), of which 12,925.02 tons were diverted from the landfill, for a diversion rate of 87.9%. The quantity of waste is consistent with averages for concrete and masonry buildings of the types on site (50-80 pounds per square foot of demolished area).

**Project Diversion Totals**

(Percent)



Effects of Diversion

Exact landfill and concrete hauling costs were not provided to WasteCap, but based on the information known about the rebates from metal sales and costs of salvage, combined with Madison area averages for hauling or recycling of landfill and concrete, the avoided waste disposal costs for this project were around \$1.3 million. This is an average savings of \$90 per ton.

The waste diversion efforts kept about 13,000 tons of C&D waste from the Madison Prairie landfill, which when compacted saves around 13,000 cubic yards of space. Madison Prairie has been filling at an

average of 79,000 cubic yards per year over the last five years, and has around 1 million cubic yards of space left. This means that Monona’s waste diversion effort has extended the life of the Madison Prairie landfill by about 2 months, meaning at least 2 more months before Dane County will need another massive new landfill.

The projects waste diversion efforts also reduced energy consumption and CO2 emissions due to avoided construction material extraction, production, transportation, and landfilling. Calculated using the EPA’s WARM model<sup>1</sup> for Wisconsin and local factors such as distance from the project to landfill and recyclers, the ripple effects mean more than just dollars are saved. To put it in perspective:

- CO2 savings is equivalent to:
  - Removing 1 year’s emissions from 642 passenger vehicles
  - Conserving 343313 gallons of gasoline
  - Conserving 127126 cylinders of propane used for home barbeques
- Energy savings is equivalent to:
  - Conserving 1 year’s energy for 414 Households
  - Conserving 7853 barrels of oil
  - Conserving 367248 gallons of gasoline

**Key Metrics**

Estimated Disposal Cost	\$112,626.00
Estimated Disposal Cost without Diversion	\$1,469,968.95
Avoided Disposal Costs	\$1,357,342.95
Average Savings Per Ton Over Landfill	\$92.34
CO2 Emissions Reductions (Metric Tons)*	3051.03
Energy Savings (Million BTU)*	42164.32
Months Added to Madison Prairie Landfill	1.98

\*From EPA WARM Model outputs for this project

**Material Breakdown**

Material	Actual Project Waste (tons)	% of Total Project Waste
Reused Concrete/Asphalt	12310.00	83.7%
Recycled Metals	549.74	3.7%
Recycled Concrete/Masonry	40.00	0.3%
Recycled Wood/Brush	20.00	0.1%
Salvage	5.28	0.0%
Mixed C&D Recycling	0.00	0.0%
Mixed C&D Landfilled	1774.67	12.1%
<b>Total</b>	<b>14699.69</b>	
<i>Diverted</i>	<i>12925.02</i>	<i>87.9%</i>
<i>Landfilled</i>	<i>1774.67</i>	<i>12.1%</i>

<sup>1</sup> EPA WARM Model: <https://www.epa.gov/warm>

## **Potential Improvements**

This project achieved an 87.9% diversion rate. Salvage opportunities at the church were missed, due to demolition proceeding ahead of schedule, but the quantity of salvageable material is unknown because the initial survey was completed prior to the tenant vacating the property. Some additional metal materials went unsalvaged because they had been slated for recycling.

Of the 1775 tons sent to landfill after hazardous material abatement, there was likely several other recyclable material streams that could have been separated, or sent to a commingled recycling center. About a third of the landfilled material may have been recyclable, including, but not limited to:

1. Carpet
2. Ceiling tile
3. Clean (unpainted, untreated) wood
4. Additional metals and unpainted masonry
5. Window glazing (if sufficient quantities existed)
6. Non-asbestos asphalt and pvc roofing materials

Diverting these materials may have added up to 4% diversion and saved an additional \$5000-\$15000 in reduced disposal costs.

## **Conclusion**

The project did not achieve the targeted 90% diversion rate, though it came close. Had WasteCap done additional pre-demo analysis and monthly progress inspections, tracking and reviews, providing direction to the demolition team on additional waste stream separation as it became clear it would be needed, it is likely a diversion rate above 90% could have been achieved.

Targeting high diversion rates (>80%) is a laudable and achievable goal on many project types. The financial and environmental benefits are not insignificant. However, achieving rates that high takes consistent dedication by a knowledgeable and responsive team to identify and solve potential problems, and adjust for forecast progress throughout the project. These are services WasteCap is well positioned to provide.

We congratulate you on your success and hope to work with you again in the future to continue to turn waste into resources!