



Environment and Natural Resources Trust Fund

M.L. 2023 Approved Work Plan

General Information

ID Number: 2023-219

Staff Lead: Michael Varien

Date this document submitted to LCCMR: December 12, 2023

Project Title: Statewide Diversion of Furniture and Mattress Waste Pilots

Project Budget: \$2,833,000

Project Manager Information

Name: Shawn Dolan

Organization: EMERGE Community Development

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Project Reporting

Date Work Plan Approved by LCCMR: October 26, 2023

Reporting Schedule: April 1 / October 1 of each year.

Project Completion: June 30, 2025

Final Report Due Date: August 14, 2025

Legal Information

Legal Citation: M.L. 2023, Chp. 60, Art. 2, Sec. 2, Subd. 08q

Appropriation Language: \$2,833,000 the first year is from the trust fund to the commissioner of natural resources for an agreement with EMERGE Community Development to work collaboratively with the University of Minnesota, Second Chance Recycling, and local governments to test and implement methods to expand mattress and furniture recycling statewide, including by researching value-add commodity markets for recycled materials, piloting mattress collection in greater Minnesota counties, piloting curbside furniture collection in the metropolitan area, and increasing facility capacity to recycle collected mattresses. Any revenue generated from selling products or assets developed or acquired

with this appropriation must be repaid to the trust fund unless a plan is approved for reinvestment of income in the project. This appropriation is subject to Minnesota Statutes, section 116P.10.

Appropriation End Date: June 30, 2026

Narrative

Project Summary: Develop pilot programs to increase mattress recycling, pilot curbside furniture recycling program, and evaluate the effectiveness of mattress and furniture recycling to reduce the impact of disposal on the environment.

Describe the opportunity or problem your proposal seeks to address. Include any relevant background information.

In Minnesota, each year, an estimated 400,000 mattress units are disposed of in the state. It is estimated 285,000 are landfilled, 15,000 are illegally dumped and 100,000 are recycled demonstrating a huge waste reduction potential by recycling more items already in the legal waste stream. Soft furniture has similar problems, and higher rates of illegal dumping. Too often recycling is not considered to be an option, because the costs often outweigh the value of materials. As a result, most furniture that can't be reused ends up in a landfill.

There is an urgent need to divert mattresses and soft furniture from landfills. A mattress uses 28 cubic feet of landfill space and is 400 percent less compactible than typical household garbage. An average couch can weigh up to 300 pounds and takes up an average of 52 cubic feet. We know that when properly handled, 90% of a mattress can be recycled. Every mattress recycled is equivalent to 2-3 weeks of household trash, calculated by weight. However, because mattresses cannot be compressed, they take up far more space by weight than household waste, making mattress and soft furniture recycling a huge untapped opportunity for waste reduction.

What is your proposed solution to the problem or opportunity discussed above? Introduce us to the work you are seeking funding to do. You will be asked to expand on this proposed solution in Activities & Milestones.

Emerge will coordinate a minimum of 3-5 pilot programs to determine the most effective methods for mattress collection and soft furniture recycling in urban, rural, and small city locations. These will include working with municipalities and potentially other recycling entities present in these locations. Optimal fees will be tested and full cost evaluation will be conducted in each program. Natural Resources Research Institute (NRRI) in Duluth, MN will research and develop mattress and soft furniture recycling methods and identify viable uses and users for materials recovered through recycling. Second Chance, which is part of Emerge Community Development and an established leader in recycling, will increase its capacity and will deconstruct and recycle 50,000 mattresses collected through the pilot programs including through methods developed by NRRI. Emerge will create a report to summarize and share findings from all pilots.

What are the specific project outcomes as they relate to the public purpose of protection, conservation, preservation, and enhancement of the state's natural resources?

The primary project outcome is to develop collection methods and processes that can significantly increase the volume of mattress and soft furniture collected, recycled, and/or reused statewide every year. During the funding cycle, this project will collect, deconstruct, and recycle an additional 60,000 mattresses. 50,000 will be deconstructed and recycled by Second Chance and 10,000 will be deconstructed and recycled at other facilities. We will also develop cost structure information that will be used to create more permanent recycling programs following funding end.

Project Location

What is the best scale for describing where your work will take place?

Statewide

What is the best scale to describe the area impacted by your work?

Statewide

When will the work impact occur?

During the Project and In the Future

Activities and Milestones

Activity 1: Planning period for Mattress and Soft Furniture Recycling Pilot Programs (90 days)

Activity Budget: \$44,000

Activity Description:

The purpose of the planning period is to develop initial pilot programs and lay the ground work for a successful launch.

- 1) Collaborate with partners to create tailored pilot programs
 - a. Take into account local conditions.
 - b. Utilize area population and logistics data
 - c. Design with the goal of a significant increase in recycling rates
- 2) Determine baseline data for mattress quantities, processing capacity, and recycling rates at each site.
- 3) Develop a monitoring plan to analyze collected program data
- 4) Develop a reporting standards and methodologies to be used across all mattress pilot programs

Our Initial pilot launches are expected to be in Pope/Douglas, Lyon, Olmstead, and Saint Louis counties. Other counties and cities will likely be added during and after the planning period. Pilots will involve testing the following variables in various regional hubs around the state, depending on the local market: amount charged for collection, pick-up vs. drop-off, hours of operation, timing of delivery of mattresses to regional hubs and Second Chance Recycling.

Activity Milestones:

Description	Approximate Completion Date
Hire Consultant with strong background in statistics to gather baseline data	November 1, 2023
November 30, 2023	
Work w/partners to develop pilots meeting geographical needs and local concerns	December 31, 2023
Use established baseline data from consultant as part of the pilot development	December 31, 2023
Amend work plan with new activity and milestones for each pilot once ready for implementation	December 31, 2023
Launch 3-5 Mattress Collection and Recycling Pilot Programs	January 31, 2024
Launch Furniture Recycling Pilot Program with NRRI which is dependent on Activity 2	January 31, 2024

Activity 2: Furniture deconstruction and value-add commodity research in partnership with Natural Resources Research Institute (NRRI)

Activity Budget: \$176,532

Activity Description:

NRRI will develop processes to collect material from soft furniture and mattress recycling and determine what commodities can be repurposed and for what.

NRRI will work with us to collaborate with city and county agencies as statewide recycling programs evolve to 1) develop and test processes for furniture deconstruction to develop optimal strategies, and 2) develop and expand markets and disposal strategies for reclaimed mattresses and soft furniture materials that minimize use of landfills.

NRRI will explore methods and create instruction guides for efficiently deconstructing various types of soft furniture and mattresses while preserving the materials for reuse/ repurposing.

NRRI will research the availability of markets for the materials from soft furniture and mattress deconstruction, identify opportunities for each type of material and share the information with Second Chance.

Bio-mas Char is one of these opportunities. Bio-mas Char sourced from wood, wood processing waste, lumber and furniture mill waste can be used as a catalyst in green energy applications. .

As statewide recycling programs evolve, NRRI will participate with Second Chance in meetings to build partnerships with state, county and community leaders, business owners and other vendors to introduce the alternative commodity materials from soft furniture and mattress deconstruction.

Activity Milestones:

Description	Approximate Completion Date
Develop efficient method of breaking down furniture/mattress components into commodities	March 31, 2024
Investigate processing wood material for reuse and/or charred material for fuel	March 31, 2024
Bench scale and scale-up processing of chars based on potential end uses	March 31, 2024
Lead student market research team on opportunities of reusing fabric/internal materials from furniture/mattresses	June 30, 2024
1+ reports w/results: furniture&mattress deconstruction methods&instruction guide, materials reuse potential, market analysis	September 30, 2024

Activity 3: Second Chance Mattress Deconstruction and Recycling

Activity Budget: \$1,956,000

Activity Description:

Pilot programs will deliver an anticipated 50,000 mattresses to Second Chance deconstruction facility. Recycling activity tracking and reporting of mattresses deconstructed by Second Chance. The vast majority of the funding will go to labor but also includes, incremental maintenance costs proportional and directly related to mattresses received via pilot programs, as well as deconstruction supplies. This activity will build capacity at second chance to deconstruct the mattresses collected and transported to Second Chance facility. 14 leadership and production jobs will be utilized including new shifts as needed to specifically support this project.

This activity will be the backbone to processing all the volumes collected and transported for recycling from the pilot programs. It is anticipated over the entirety of 2.5-year project Second Chance will deconstruct and process an additional 50,000 mattresses over the timeline of the project above and beyond current volumes.

10,000 additional mattresses are anticipated to be recycled in the pilot programs themselves using existing infrastructure in the state (see pilot program/activities for budget and deliverables).

Activity Milestones:

Description	Approximate Completion Date
Hire approximately 14 new staff to ramp up deconstruction	January 31, 2024
Increase Second Chance capacity to support increased mattress processing using multiple shifts	January 31, 2024
Deconstruct and recycle an additional 20,000 mattresses in year one	January 31, 2025
Deconstruct and recycle an additional 30,000 mattresses in year two	January 31, 2025
Evaluate the effectiveness and report on modifications of ongoing mattress and furniture recycling efforts.	January 31, 2025
Final white paper summarizing learnings, including NRRI's, to educate legislators&counties&commercial partners on	January 31, 2025
Track&report #ofmattresses Second Chance deconstructed, material sold for reuse and/or landfilled	June 30, 2025

Activity 4: TBD Pilot Programs

Activity Budget: \$656,468

Activity Description:

To expand service statewide, we will work with municipal partners to determine the most appropriate sites for the mattress collection and recycling pilot programs. If local recycling facilities exist, they will be utilized to the extent of their capacity. Many factors affect these questions and we will work with each partner directly to determine the answer. Second Chance will recycle any volumes that exceed local capacity.

There are no comparable established practices for soft furniture recycling. However, it is similar to mattress handling and we will leverage the experience and infrastructure of Second Chance to test and develop comparable processes and systems for furniture recycling that can be implemented at a similar scale.

We will seek amendments to the work plan to add a new activity and budget for each pilot when pilot program plans are fully developed and ready for implementation. Funds for these new activities will be moved from Activity 4 and spending will not occur until/unless approved by LCCMR. A minimum of 3-5 pilots will be developed. At least 1 pilot will be focused on soft furniture recycling.

Activity Milestones:

Description	Approximate Completion Date
Add milestones that reflect the specifics of each pilot program with each new activity.	January 31, 2024
We will include milestones to identify optimal fees and cost evaluation for each pilot.	January 31, 2024
We will include milestones to develop collection methods and processes.	January 31, 2025

Project Partners and Collaborators

Name	Organization	Role	Receiving Funds
Victor Krause	National Resources Research Institute (NRRI)	Project partner working with us in research and development to identify commodity value ad options for furniture and mattress material.	Yes
Dave McNary	Hennepin County Public Works	Collection point and existing customer who will assist in pilots.	No
Nathan Reinbold	Pope/Douglas Solid Waste Management	Collaborator working with us on multiple county wide programs with collection and logistics pilots	Yes
Tony Hill	Olmsted County	Collaborator in the collection and logistics pilots for Southeast region.	Yes
Dylan Olson	Goodwill - Duluth	Collaborator in mattress recycling logistics and seasonal storage to improve workforce and production consistency	Yes
Dave Herberholz	Minneapolis Solid Waste and Recycling	Current customer and collaborator for continuing support of mattress volumes and furniture pilot testing	No
Roger Schroeder	Lyon County Environmental	Collaborator of county wide pilot testing for mattress recycling in Southwest Minnesota	Yes
Michael Reed and Nicole Stewart	Ramsey/Washington County Recycling and Energy	Collaborator and existing customer in support of Mattress expansion and furniture research and development	No

Dissemination

Describe your plans for dissemination, presentation, documentation, or sharing of data, results, samples, physical collections, and other products and how they will follow ENRTF Acknowledgement Requirements and Guidelines.

Our plan is to host a media event at the beginning of our initiative to build excitement and create an on-air story that will also include a follow-up story. We will use all Social Media platforms for outreach as well as community events and message boards promoting the recycling efforts. Training and Operating manuals will also be created and published. We will utilize banners and vehicle wraps to create visibility in all forms. We fully acknowledge and understand all requirements of the agreement. We will use the ENRTF logo with a “made possible” statement on all promotions.

Long-Term Implementation and Funding

Describe how the results will be implemented and how any ongoing effort will be funded. If not already addressed as part of the project, how will findings, results, and products developed be implemented after project completion? If additional work is needed, how will this work be funded?

Minnesota has recently considered various legislative strategies to fund statewide mattress recycling. So far none have been adopted, in part because the full cost and best strategies are not known. Current funding strategies are different in each municipality and do not effectively cover the cost of recycling. Throughout this project, pilot programs funded through this grant will provide state leaders and legislators with fact based data that will inform future legislation. The information derived from the program is intended to reveal methods and processes. For the complete narrative see Final Work Plan Approved Word Document.

Budget Summary

Category / Name	Subcategory or Type	Description	Purpose	Gen. Ineligible	% Benefits	# FTE	Classified Staff?	\$ Amount
Personnel								
EMERGE Project Manager, Shawn Dolan, for Activity 1		Overall coordination of the LCCMR Grand and Pilots			24%	0.13		\$12,000
Second Chance Program Coordinator for Activity 1 [insert name] TBD Job has been posted		Work directly with all Partners in coordination of the agreed to pilots			24%	0.25		\$17,000
EMERGE Business Director, Kevin Engdahl, for Activity 1		Provide overall project consulting			24%	0.06		\$8,000
12-14 Staff		Staff Overcoming Barriers to Employment To Deconstruct Mattresses and Furniture			18%	14		\$1,146,000
Second Chance Program Coordinator		Work directly with all Partners in coordination of the agreed to pilots.			24%	1		\$70,000
Second Chance Operations Manager		Direct oversight of production labor			24%	0.33		\$65,000
4 Second Chance Production Leads		Day to day attendance, production, training and workflow			24%	0.33		\$200,000

3-4 Second Chance Truck Drivers		Drivers to Collect mattresses and furniture			18%	1.5		\$135,000
Project Manager		Overall coordination of the LCCMR Grant and Pilots			24%	0.25		\$90,000
Business Director		Provide overall project consulting			24%	0.05		\$30,000
Equipment Maintenance Manager		For maintenance activities that do not require outside professional services			24%	0.05		\$20,000
							Sub Total	\$1,793,000
Contracts and Services								
Natural Resources Research Institute (NRRI)	Sub award	R&D conducted by NRRI. Partner with Second Chance, city and county agencies. Develop processes for alternative commodity partnerships for re-purposing materials from furniture/mattresses. In addition to the \$172,442 personnel (which includes project coordinator and fractional personnel, project contributors, engineering, science, See attached WORD Document for full narrative.				4.22		\$176,532
Contract Consultant TBD	Professional or Technical Service Contract	Hire Consultant to help gather the appropriate baseline data with strong background in statistics that creates competence in the output.				0.02		\$5,000
Pilot Programs Activity 4 TBD	Professional or Technical Service Contract	A minimum of 3-5 Pilot mattress collection programs with City, County, Commercial partners after the Planning period has been completed. Detailed budgets will be attached and spending may not occur until/unless approved by LCCMR. See attached word document for full narrative.				1.75		\$656,468
TBD	Professional or Technical Service Contract	Professional services to maintain equipment proportional to volume including forklift/baler maintenance services				0.05		\$19,000
TBD	Professional or Technical Service Contract	Create final report or white paper that summarizes learnings from pilots, including training manual and collection documentation				0.05		\$10,000
TBD Biochar services	Professional or Technical	Second Chance recycling component related to NRRI's research activity				0.05		\$20,000

	Service Contract							
							Sub Total	\$887,000
Equipment, Tools, and Supplies								
	Tools and Supplies	PPE including gloves, boots, aprons, hard hats, safety glasses	To protect staff from cuts, injuries and contaminants					\$20,000
	Tools and Supplies	Supplies to Maintain Equipment proportional to use related to project including lubricants, wearable machine components, wire, ect.	To ensure safe, efficient operation of equipment					\$10,000
	Tools and Supplies	Disposable supplies such as box cutters and other hand tools	To maintain cutting and safety standards					\$80,000
							Sub Total	\$110,000
Capital Expenditures								
		Machine to deconstruct mattresses, box springs or their sub-components (1 machine @ \$35k)	Machinery needed to increase capacity and efficiency to deconstruct the additional mattresses collected by pilot programs.	X				\$35,000
							Sub Total	\$35,000
Acquisitions and Stewardship								
							Sub Total	-
Travel In Minnesota								
	Miles/ Meals/ Lodging	Emerge pilot program planning and project oversight	Activity 1 Partner meetings in greater Minnesota and from greater Minnesota to the metro.					\$2,000
	Miles/ Meals/ Lodging	EMERGE Pilot Programs oversight TBD	Travel to pilot and collection sites					\$5,000
	Miles/ Meals/ Lodging	Second Chance	Local Second Chance travel to coordinate recycling activities est. 1500 miles					\$1,000
							Sub Total	\$8,000

Travel Outside Minnesota								
							Sub Total	-
Printing and Publication								
							Sub Total	-
Other Expenses								
							Sub Total	-
							Grand Total	\$2,833,000

Classified Staff or Generally Ineligible Expenses

Category/Name	Subcategory or Type	Description	Justification Ineligible Expense or Classified Staff Request
<p>Capital Expenditures</p>		<p>Machine to deconstruct mattresses, box springs or their sub-components (1 machine @ \$35k)</p>	<p>Machinery will continue to be used by Second Chance for the life of the machine for mattress and furniture deconstruction and recycling which is expected to last 10 years. Additional Explanation : Specialized machines that mechanically separate components of mattresses or box springs. Machinery is needed to increase capacity and efficiency to deconstruct the additional mattresses collected by pilot programs. Additional Explanation : Machinery will continue to be used by Second Chance for the life of the machine for mattress and furniture deconstruction and recycling which is expected to last 10 years. Additional Explanation : Specialized machines that mechanically separate components of mattresses or box springs. Machinery is needed to increase capacity and efficiency to deconstruct the additional mattresses collected by pilot programs.</p>

Non ENRTF Funds

Category	Specific Source	Use	Status	\$ Amount
State				
			State Sub Total	-
Non-State				
In-Kind	NRRI	unrecoverable indirect expenses	Secured	\$97,093
In-Kind	EMERGE	unrecoverable indirect expenses	Secured	\$100,000
In-Kind	Olmsted County	unrecoverable indirect expenses	Secured	\$20,000
In-Kind	Lyon County Environmental	unrecoverable indirect expenses	Secured	\$20,000
In-Kind	Pope/Douglas Solid Waste Management	unrecoverable indirect expenses	Secured	\$20,000
In-Kind	Hennepin County Public Works	unrecoverable indirect expenses	Secured	\$20,000
In-Kind	Goodwill Duluth	unrecoverable indirect expenses	Secured	\$20,000
In-Kind	Minneapolis Solid Waste & Recycling	unrecoverable indirect expenses	Secured	\$20,000
In-Kind	Ramsey/Washington Recycling & Energy	unrecoverable indirect expenses	Secured	\$20,000
In-Kind	Second Chance Recycling	Unrecoverable indirect expenses, in-kind personnel time, equipment, systems, infrastructure and space	Secured	\$150,000
			Non State Sub Total	\$487,093
			Funds Total	\$487,093

Attachments

Required Attachments

Visual Component

File: [598c471a-09c.pdf](#)

Alternate Text for Visual Component

Second Chance Recycling Center...

Financial Capacity

File: [05ab6aac-23c.pdf](#)

Board Resolution or Letter

Title	File
Signing Authorization	079d7cfa-8b8.pdf
Board Resolution Document	d086ec8e-eab.docx

Optional Attachments

Support Letter, Photos, Media, Other

Title	File
Hennepin County Letter of Support	b2ca54ec-f42.pdf
Lyon County Minnesota Letter of Support	fb3814da-80c.pdf
City of Minneapolis Letter of Support	7100f221-ec0.pdf
NRRI Letter of Support	12069a1c-0f0.pdf
Pope/Douglas County Minnesota Letter of Support	4daf93f9-9b8.pdf
Olmsted County Minnesota Letter of Support	ec81ed92-04d.pdf
Ramsey/Washington County Recycling and Energy Letter of Support	41373f9e-433.pdf
PDF graphic "About EMERGE and Second Chance"	7a2c352a-7d5.pdf
Duluth Goodwill Letter of Support	c91c73c0-cff.pdf
Natural Resources Research Institute (NRRI) Budget	534c16aa-788.docx
Background Check Certification form	cbbcc8c1-36d.pdf
Budget Spreadsheet Approved November 2023	894ea27e-ce7.xlsx
Final Work Plan Approved November 2023	1fc8ea83-682.docx

Difference between Proposal and Work Plan

Describe changes from Proposal to Work Plan Stage

Corrected the budget. Modified narratives from bulleted to statement format.

Additional Acknowledgements and Conditions:

The following are acknowledgements and conditions beyond those already included in the above workplan:

Do you understand and acknowledge the ENRTF repayment requirements if the use of capital equipment changes?

Yes

Do you agree travel expenses must follow the "Commissioner's Plan" promulgated by the Commissioner of Management of Budget or, for University of Minnesota projects, the University of Minnesota plan?

Yes, I agree to the Commissioner's Plan.

Does your project have potential for royalties, copyrights, patents, or sale of products and assets?

Yes

Do you understand and acknowledge IP and revenue-return and sharing requirements in 116P.10?

Yes

Do you wish to request reinvestment of any revenues into your project instead of returning revenue to the ENRTF? If so, describe here:

Yes, The revenue generated from the recycling process today (\$60,000/annual) comes mainly from the metal value which fluctuates with commodity markets. Currently the foam and material generate insignificant revenue. The wood is a cost to Second Chance (\$300/ Mo) Working with NRRI we hope to identify value add commodity streams for these and other items in the mattress and soft furniture deconstruction process. This will lead to a sustainable model for all outflow materials. The revenue generated from value-add commodity materials will be reinvested in cost to deconstruct and recycle more mattresses.

Does your project include original, hypothesis-driven research?

Yes

Does the organization have a fiscal agent for this project?

No