TECHNICAL REPORT #1

STORM SHELTER LESSONS LEARNED

Northcountry Cooperative Foundation

Storm Shelter Prototype Updates

June 6, 2022

NCF

Report Prepared By:

TSP Architects and Engineers
1500 Highway 52 North
Rochester, Minnesota 55901
507-288-8155

TSP Architecture Engineering Planning

INTRODUCTION

In 2019, Northcountry Foundation (NCF) and TSP Architects and Engineers collaborated with Park Plaza cooperative in Fridley, MN to design and construct an entirely above ground, standalone dual use storm shelter / community center. The design intended to accommodate the widest range of Park Plaza's needs (See Appendix A). The project in the end was a success, but during the life of the planning, design and construction, there were multiple instances where opportunities have been identified to improve the process for implementation of future storm shelter projects.

Below, the process has been broken down into phases and expanded to further detail the areas for improved project delivery.

PLANNING

Community Engagement

Prior to starting the planning process, engaging the community to discuss the potential of a storm shelter and to facilitate listening sessions to create buy-in for the proposed projects will be crucial to ensure all community members have a platform to provide feedback as well as to understand the project and what the process will entail to bring a shelter project to reality.

Grant Applications

In most scenarios, a cooperative will be seeking grant funding to at least partial fund a portion of their storm shelter. These grant applications require that NCF and the Cooperative are in alignment the requirements and structuring of the grant applications. Many times, the project will only be able to move forward with this supplement funding, therefor the careful attention and engagement in the grant development will be needed.

Feasibility Study

Prior to engaging fully in the design and development of a storm shelter, a preliminary feasibility study should be conducted that would analysis the community needs, financial position / needs, site location suitability, prototype strategy and initial cost estimate (approx. cost per square foot). This allows for the cooperative to understand the ability for the project to move forward prior to substantial investment of time and/or money.

Capital Improvement Project(s) Process / Policy / Procedures

Whether it is a storm shelter or sewer replacement, these large investment capital improvement projects are complex with many stakeholders, requirements and needs to identify and navigate risks

and successful completion. Many times, cooperatives have never undertaken projects of this size. With this, the development of a 'Process for Capital Improvement Projects" can become a 'road map' that cooperatives can follow toward a successful project. This will also likely identify the need for a cooperative to have certain policies and procedures in place formalizing aspects of the process, for example the decision-making structure, so that when a project is initiated it is clear to everyone how it will be managed and completed.

Owner / Program Manager Contract

With many of these projects, NCF acts as an Owner's representative, helping to manage and provide input to Cooperative Boards. In addition to this, there are certain aspects where it would be advantageous for NCF to have the ability to act on behalf of the cooperative as their agent. Formalizing this relationship with an agreement would be recommended for both parties to clearly communicate roles, responsibilities, and limitations to mitigate the potential risk involved. The American Institute of Architects (AIA) have a 'Program Manager' series of agreements that are tailored towards this type of relationship and can be a helpful starting point for this discussion.

Contractor Selection

Hiring a General Contractor or Construction Manager early in the process will allow for more accurate cost estimating, ability to navigate and discuss risk earlier, and developing a strong working relationship as the process evolves. This also allows for a cooperative to hire a contractor on qualifications and 'fit' rather that solely on low- bid. There are many ways this relationship can be formalized, all depending on the cooperative preferences, grant requirements and/or other construction procurement needs.

DESIGN

Architect / Contractor Board Participation

During design, there are inherently questions relating to project development as well as decisions needing to be made for final project bidding and completion. Having the Architect and Contractor participate in the board meetings will all for questions, concerns, and comments to be addressed.

Community Engagement

In addition to participating in board meetings, the Architect and/or Contractor could also take part in select community engagement opportunities, again, to address questions and concerns from the community. This brings transparency and further buy-in from the residents.

Project Programming

Facilitating more in-depth project programming will be helpful to best understand the needs and wants of the community and to appropriately establish expectations of what the design will and will not provide once completed. This programming will also allow for detailed discussions of how the project can be scaled – by overall size, level of quality and/or valuation of cost in order to optimize owner project goals.

Landscape Design / Architecture

To bring additional value and emphasis as a community hub, well-considered and design landscape architecture adds to the overall aesthetics of the building. The landscape design can be provided by a dedicated designer or could be implemented through a nursery that offers those services for design and installation.

Technical Design Considerations

Storm Doors Opening Assistance – the hollow metal doors that are rated for windstorm events are quite heavy due to the need to protect against projectiles. This causes difficulty in the opening of the door as well as a safety concern should someone get their fingers caught in the door. It is recommended the architect provide a door actuator/assist (push button) that would help aid in the opening and closing the doors. This would primarily need to be used in the design on the main door of a dual use shelter.

Office Window – Providing a window in the office is an appropriate element for the office staff to have access to daylight. If part of the shelter enclosure, this window would be required to have a storm shutter that would have to be closed during a windstorm event.

Omit Cooking Appliances – It is recommended to omit any cooking appliances within a dual use shelter to mitigate potential risk of community used equipment. Providing a sink, cupboards and countertop could still be provided to support needs of the facility.

Improved Front End Specifications – Even though it is recommended that cooperatives engage a contractor early in the planning and design process, they would still need / want to bid out certain trades for construction. To ensure all the contractors are aware of the needs and quality assurance requirements necessary, we recommend a robust 'Front End' specification which details the management, quality assurance, and legal needs of the project. This is also where we will be able to detail what mechanisms are part of the construction contract that could be used to ensure contractor performance on the project.

CONSTRUCTION

Information Session

When it is time for construction, there will be many changes for the community. It will be important to have an information session for the entire community to discuss: What will be happening, safety requirements, schedule and timeline, things to keep in mind as well as some reminders as it relates to engaging with any contractors.

Ongoing Communications

Throughout the duration of the construction, the need to communicate to the community on what is happening and what they can be expecting to happen can not be overstated. The need to 'over' communicate to ensure full transparency and awareness will go a long way in ensuring positive public relations and to address any concerns quickly.

Communication Channels

Establishment of necessary communication channels to ensure the contractors are only getting direction from a single entity mitigates any risks of unnecessary additional costs and achievement of desired results. These communication channels can be established in the agreements executed for the various stakeholders and/or can be part of the policy and procedures discussed earlier under 'Planning'.

Regular construction meetings

Having weekly or bi-weekly construction meetings with the Owner, NCF, Architect and Contractor will allow for the opportunity to touch base and to address any outstanding issues, change orders and share other necessary information. It allows for communications channels to remain open and to address issues quickly and efficiently.

Safety

The selected contractor will be required to appropriately implement safety measures to not only ensure safety contractors, but also for the community at large. This includes a fence around the perimeter that is secure, considered access by trucks or other large equipment to the site and any other scenario where community members may be affected by construction activities.

POST-CONSTRUCTION

Operations and Maintenance Manuals

Providing well-organized and complete operations and maintenance manuals for the cooperatives use will be necessary to ensure that the building systems can be operated correctly and maintained appropriately to ensure adequate operation. The requirements for these manuals will be detailed in the front-end specifications identified under 'design'.

Training

Some of the building systems will be unique to storm shelters, such as power invertors or generators for back up power. In-person training will be necessary in addition to the operations and maintenance manuals to make sure that Owner understands the needs for the equipment. This training can be recorded so that future residents can be fully informed. The requirements for this training will be detailed in the front-end specifications identified under 'design'.

Building Access / Security

There is a need to be clear on how the building will be secured and accessed, given that it is a community building. There are many options for this such as a push-pad for keyless entry or other remote entry. Additional security will likely be necessary where video and/or intercom systems can be included. Building access can be detailed in the policies and/or procedures that are indicated above under 'Planning'

TECHNICAL REPORT #2

INTRODUCTION TO STORM SHELTERS

Northcountry Cooperative Foundation

Storm Shelter Prototype Updates

June 6, 2022

Report Prepared By:

TSP Architects and Engineers
1500 Highway 52 North
Rochester, Minnesota 55901
507-288-8155

TSP Architecture Engineering Planning

INTRODUCTION

In Minnesota and Wisconsin, manufactured home communities are required to have an area of refuge in the event of tornado or windstorm. These areas of refuge are often located off-site or if there are accommodations on site with a storm shelter, they are undersized, non-accessible and in poor condition. As awareness of the need for adequate storm shelters in increases, communities are looking for a better understanding of what that looks like and how it can become a reality. In addition to providing protection from a tornado, many communities are also creating these storm shelters to be used community centers elevating it from a 'bunker' to a beautiful, multi-functional facility that can be used year around.

DEFINING STORM SHELTERS

A storm shelter is a hardened structure that is designed to meet state building code ICC-500 or Federal Emergency Management Agency (FEMA) 361 design criteria. The term "hardened" refers to specialized design and constr4uction applied to a room or building to allow it to resist pressures and windborne debris impacts during a high-wind event and serve as a shelter. [1] Occupants of a storm shelter built to these standards will have a very high probability of protection. In addition to hardened construction, these storm shelters also include bathrooms and adequate ventilation, comfort, power and lighting systems to shelter in place for up to two hours.

In Southern Minnesota and Southern Wisconsin, a storm shelter needs to be designed to withstand 250 mph winds and to resistance windborne Debris (commonly referred to as missiles) traveling 80-100 mph. This is the equivalent to an EF-5 tornado – the highest graded tornado on the EF Scale. See

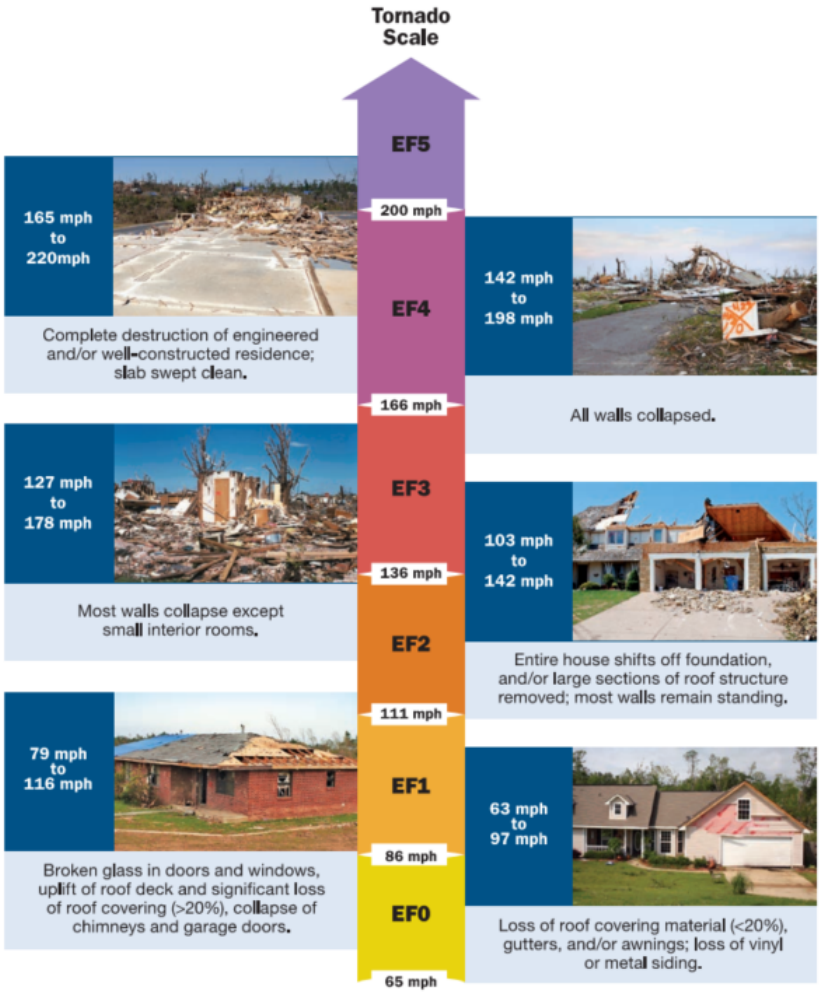


Figure 1.

Figure 1 – Typical tornado damage according to the EF scale
Source of Graphic: FEMA P-320 March 2021. Source of Data: NOAA national Weather Service, Storm Protection Center

Wind Shelter Design and Construction Codes, Standards, Guidance Comparison Table[1]

Title or Name of Document	Code, Reg, Standard, or Statute?	Wind Hazard	Wind Map[2]	Wind Design Coefficient Considerations[3,4]	Debris Impact Criteria[5]	Remarks
FEMA Shelter Publications: FEMA 320 *Taking Shelter From the Storm: Building a Safe Room Inside Your House* (2004) **FEMA 361** *Design and Construction Guidance for Community Shelters*	FEMA guidance document, not a code or standard. "Best Practice" for high-wind shelters	Tornado and Hurricane	**FEMA 320:** Hazard map, but wind speeds not used for design **FEMA 361:** Map with four wind speed zones for design (wind mri is 10,000–100,000 years). This map is often referred to as the "FEMA 361 map."	**FEMA 320:** N/A – prescriptive design guidance for maximum hazard **FEMA 361:** Use FEMA 361 wind speed map with four zones. Calculate pressures using ASCE 7 methods and use I=1.0, K_d=1.0, Exposure C, no topographic effects, GCpi=+/-0.55 (this will account for atmospheric pressure change [APC])	Test all shelters with the representative missile: a 15-lb 2x4 at 100 mph (horizontal) and 67 mph (vertical)	**FEMA 320:** Intent is to provide "near-absolute protection." No certification is provided. **FEMA 361:** Intent is to provide "near-absolute protection." Shelter operations guidance is provided. Occupancy issues addressed. Wall section details provided. No certification is provided.
International Code Council/ National Storm Shelter Association (ICC/NSSA) High Wind Shelter Standard (ICC-500) – currently in development, tentatively available for adoption in January 2008.	Consensus standard for shelter design and construction, available for adoption in January 2008. To be incorporated by reference into the 2009 IBC and IRC.	Tornado and Hurricane	**Tornado:** Uses FEMA 361 map.	**Tornado:** Use FEMA 361 wind speed map. Calculate pressures using ASCE 7 methods and use I=1.0, K_d=1.0, Exposure as appropriate, no topographic effects, GCpi=+/-0.55 or +/-0.18+APC	Test shelters with representative missile (missile speed dependent on site design wind speed): **Tornado:** 15-lb 2x4 at 85–100 mph (horizontal) and 2/3 of this speed (vertical).	Intent is to provide a standard for the design and construction of high-wind shelters. Will not use term "near-absolute protection." Occupancy, ventilation, and use issues are also addressed. Shelter operations guidance is provided in the commentary only (commentary is a separate document—not a consensus document).

Figure 2

Source: FEMA, Storm Shelters: Selecting Design Criteria – August 2007

INNOVATIONS AND BEST PRACTICES

Above ground storm shelters have been around for many decades, but over the past several years, as weather is seeing more extremes, more often, as well as some high-profile tornado-related school fatalities as the Joplin, MO tornado of 2003, there has been a renewed emphasis in community shelters and informing the public of the hazards and mitigation options. Most recently we are seeing the following evolutions[3]:

- Number and variety of storm shelters installed
- Their quality
- Standards and guidelines
- Governmental, State, and jurisdictional initiatives
- Code requirements

With funding becoming available through FEMA or other agencies, partnered with building code requirements and standards has helped accelerate this growth. Starting in the 2015 International Building Code (IBC) included the requirement for shelters to be included in new schools and first-responder facilities in high-risk tornado regions. This partnered with the development of NSSA/ ICC 500 and FEMA P-320 and P-361 has moved the industry to produce higher quality shelters than ever before.

A quick google search will have you find any number of companies offering prefabricated storm shelters of all sorts of shapes, sizes and looks. Many of these options are for single use storm shelter applications and not a community shelter due to the size requirements of larger facilities. For larger, community dual use shelters, the hiring of a design professional is required and offers a tailored approach to the unique needs of each site.

There are different construction assembly strategies that can be applied to achieve the desired results of a community storm shelter. Those strategies include:

- Above ground, reinforced concrete block
- Entirely below ground
- Partial below ground / bermed earth
- Prefabricated concrete structures
- Monolithic Dome

The following list provides some best practices to be considered during planning and design

1. Locate community shelter in location that is easily accessible and visible
2. If possible, provide a public address system to notify community members
3. Engage a peer-reviewer to review design drawings to validate shelter criteria
4. Locate support systems inside shelter or below ground.
5. Providing windows in a community shelter is a needed feature but needs to have proper protection through shutter doors that are shut or laminated (layered) glass.

FUNDING AND INCENTIVES

There are grant funding and incentives available to contribute towards the overall cost of a shelter. There may be additional opportunities in local communities that should be researched as part of project planning. A few of the most common funding sources are identified below[4].

Community Development Block Grant Funds

On December 3, 2003, the President signed into law the Tornado Shelters Act (Public Law 108-146), which allowed communities to use community development block grant funds. To construction tornado safe shelters in manufactured home parks. These block grant funds are funded through the US Department of Housing and Urban Development (HUD) Some restrictions apply such as:

- Park must have at least 20 unites
- Within a state that has had a tornado within the current year or last three years
- Comply with known standards
- Large enough to accommodate all members and,
- Be located in an area that has a warning siren

Manufactured Home Community Redevelopment Program (MHCRP)

The Manufactured Home Community Redevelopment Program is a grant program to fund infrastructure improvements or acquisition of manufactured home parks to assist the needs for aging manufacture home communities around the state. The program will prioritize projects based on health, safety, and critical need improvements, as well as projects that leverage support from local municipalities, and/or projects converting a community to a cooperative ownership model.

Funds will be available through an annual competitive request for proposals (RFP) process, beginning in summer with funding recommendations selected mid-winter.

(Citation: https://www.mnhousing.gov/sites/lenders/ManufacturedHousing)

Workforce and Affordable Homeownership Development (WAHD)

The Workforce and Affordable Homeownership Development Program provides one-time grants for the development of workforce and affordable homeownership projects across Minnesota. The funds will serve households up to 115% of area median income and will be used for residential housing development and rehabilitation, land development, and infrastructure development and repair for manufactured home parks.

(Citation: https://www.mnhousing.gov/sites/np/communityprograms)

REFERENCES

1. Storm Shelters: Selecting Design Criteria, FEMA, HSFEHQ-07-J-0020, August 2007
2. Taking Shelter from the Storm – Building or Installing a Safe Room for Your Home, FEMA P-361, March 2001, Fifth Addition.
3. Innovation and Guidelines Rapidly Mature Safe Room Industry, Engineering News-Record, March 15, 2016. https://www.enr.com/articles/39064-innovation-and-guidelines-rapidly-mature-safe-room-industry
4. https://www.fema.gov/emergency-managers/risk-management/safe-rooms/funding

TECHNICAL REPORT #3

STORM SHELTER PROTOTYPES

Northcountry Cooperative Foundation

Storm Shelter Prototype Redesign

June 6, 2022

Report Prepared By:

TSP Architects and Engineers
1500 Highway 52 North
Rochester, Minnesota 55901
507-288-8155

TSP Architecture Engineering Planning

INTRODUCTION

These prototypes are dual-use shelters, meaning, that in addition to offering protection from the storm, they would also have another 'day to day' type use. In all the cases, it was to be a community room where an assembly of people come together.

All these prototypes are based off a 200-occupant storm shelter. If a community has occupants than what is indicated, then the shelter would need to adjust accordingly. The metric we typically use to figure the occupant load of a storm shelter is to figure 2.5 occupants per occupied and available lots in the communities. Our guiding principles were to make these buildings SAFE, ACCESSIBLE and BEAUTIFUL.

It should also be noted that the type and configuration of the materials shown on the building elevations sheets can also be revised depending on the preferences of a community. All materials shown are for representation purposes only. As stated before, we do believe these shelters should be BEAUTIFUL - not just a concrete bunker that is so commonly stereotyped of storm shelters. These buildings are legacy buildings, that will be standing for many years and need to be a place community synergy and pride.

In addition to the storm shelter prototypes detailed in the following pages, we also analyzed and considered additional alternatives as described below. However, the strategies noted below were not developed further for reasons noted below.

ANALYSIS OF ALTERNATIVES

In addition to the prototypes described on the following pages, other alternatives were reviewed but not included in the recommended prototypes for the reason described below.

Entirely Below Ground

An option for storm shelters is to put them completely underground. There are benefits to having a shelter completely underground, mainly, that you don't have to provide additional reinforcing in the enclosure because the earth creates that protection required. However, other cons, based on the goals of this study are:

- *Not accessible*
    - Being a community shelter, an accessible means of entering is required. to accomplish the ability for someone in a wheelchair at access the shelter would require a share lift which adds cost and operational maintenance costs.
- *Not an ideal community space*
    - A below ground structure does not allow for daylighting and views and makes it difficult for it to function properly as a community room or space. It lends itself to being a 'bunker'

Entirely Precast Structure

When doing research online for storm shelters, you will find many precast options that can be purchased and then placed on your site. A manufacturer would make an appropriately sized unit in a factor and then bring out to your site for final install. You would likely find these to be an affordable option, however, the following are reasons they were not considered further:

1. *Utilitarian.*
    a. Similar to the below ground options, these become very utilitarian and 'bunker-like' they are typically made of gray concrete and do only what is necessary to offer protection from a storm.

2. *Not an ideal community space*
    a. Based on the limitations for precast construction, getting a size that would be functional to have a community gathering space becomes infeasible due to manufacturer technology or cost exceeding a reasonable level

Individual Units

You may also find smaller individual units that can be provided for each lot, however, these also tend to be very utilitarian and does not promote the goals of a beautiful community gathering space.

PROTOTYPE #1 –ABOVE GROUND (Updated)

Overview

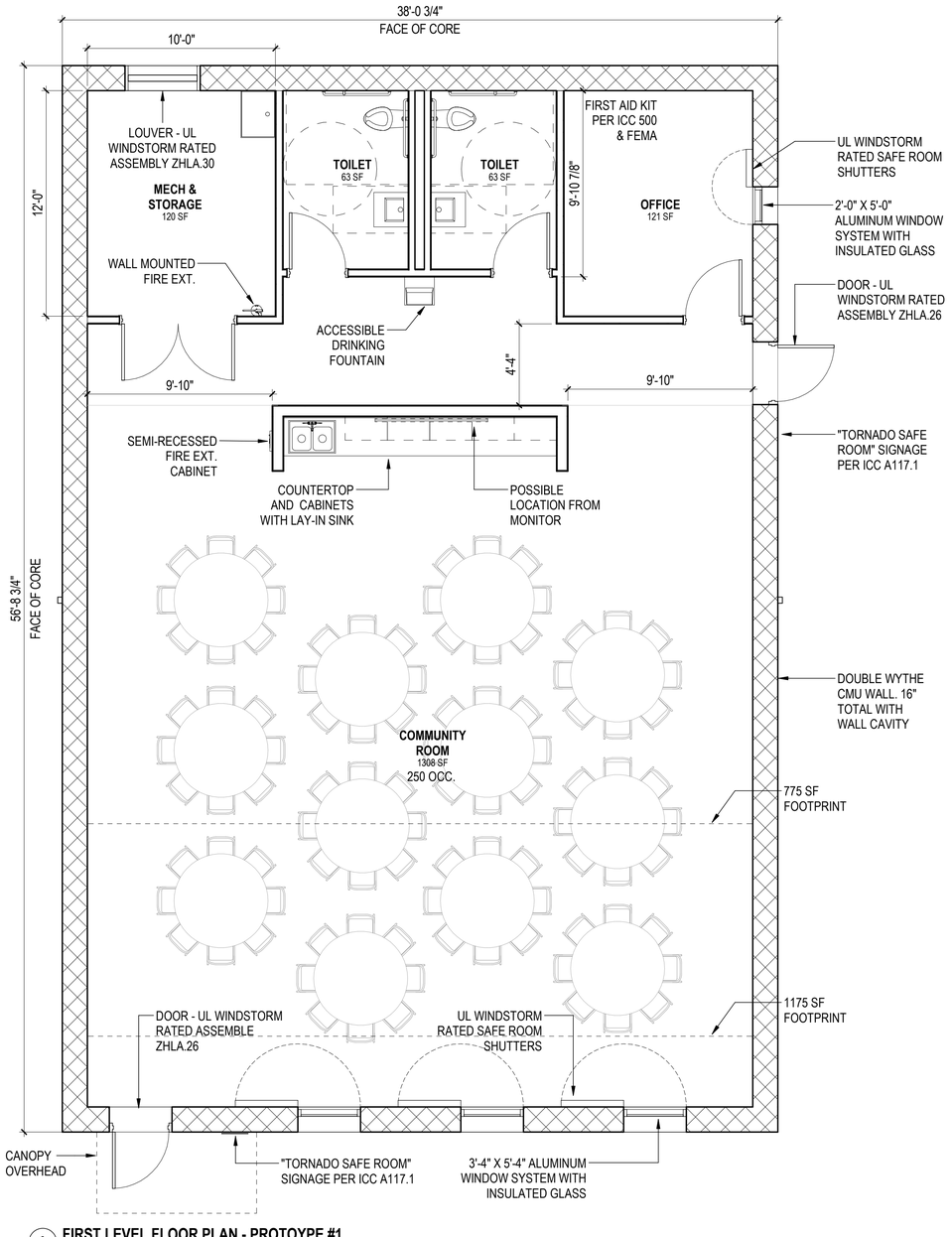
This amended above ground prototype takes lessons learned from the Park Plaza cooperative storm shelter, primarily, to ensure appropriate budgeting. This option presents a storm rated shelter that is entirely above ground with hardened construction at all exterior walls, roof, and openings.

The shelter is a dual-use facility programmed for use as a community room space along with providing protection against tornadoes in the case of emergency. This provides efficiencies in space but may result in higher costs as compared to a stand-alone shelter (no community function) because of size and level of finish.

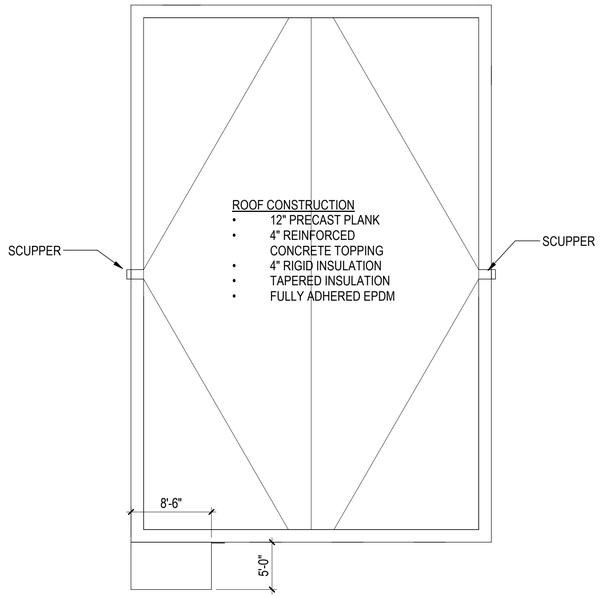
This option provides flexibility depending on the site as it can be adapted easily to meet the site constraints. It is also a preferred solution in flood prone, or high-water table areas, as it has no basement.

PLANS - PROTOTYPE #1

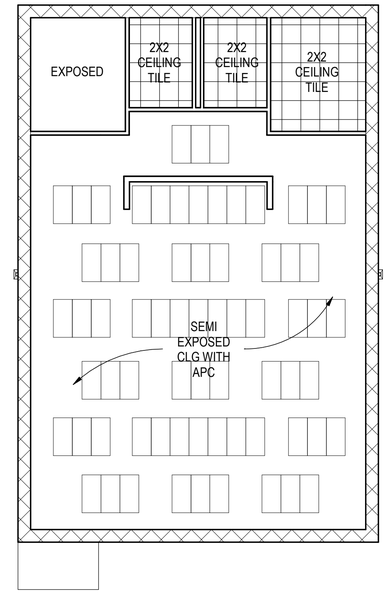
AMENDED ABOVE GROUND



A **FIRST LEVEL FLOOR PLAN - PROTOYPE #1**
SCALE: 1/4" = 1'-0"



B **ROOF PLAN - PROTOYPE #1**
SCALE: 1/8" = 1'-0"



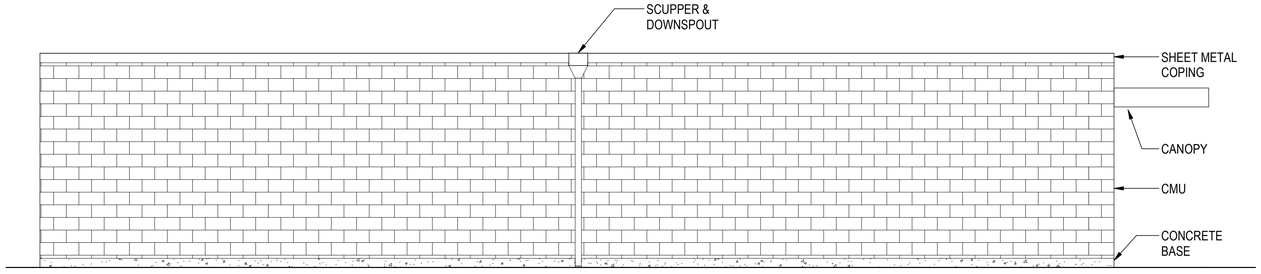
C **FIRST LEVEL CEILING PLAN - PROTOTYPE #1**
SCALE: 1/8" = 1'-0"

NORTHCOUNTRY FOUNDATION
SHELTER PROTOTYPE REDESIGN

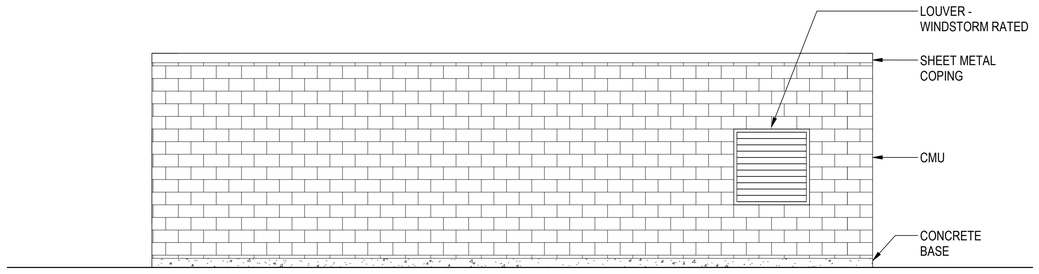
TSP Architecture Engineering Planning

EXTERIOR ELEVATIONS - PROTOTYPE #1

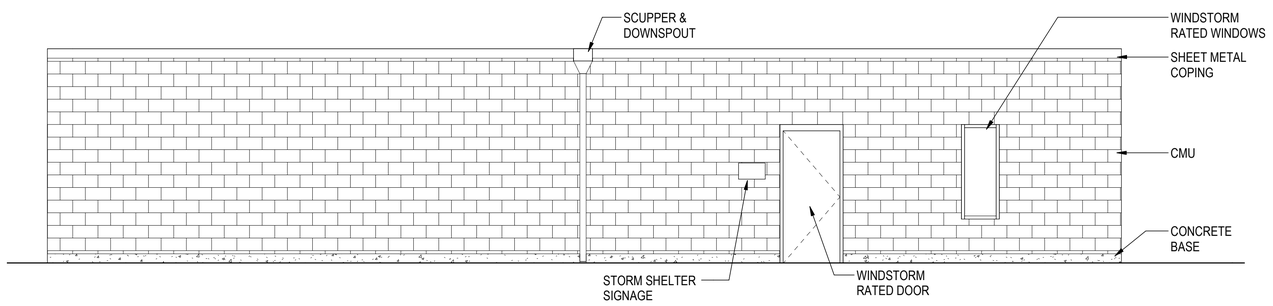
AMENDED ABOVE GROUND



A **WEST ELEVATION - PROTOTYPE #1**
SCALE: 1/4" = 1'-0"



D **NORTH ELEVATION - PROTOTYPE #1**
SCALE: 1/4" = 1'-0"



C **EAST ELEVATION - PROTOTYPE #1**
SCALE: 1/4" = 1'-0"

B **SOUTH ELEVATION - PROTOTYPE #1**
SCALE: 1/4" = 1'-0"

NORTHCOUNTRY FOUNDATION
SHELTER PROTOTYPE REDESIGN

TSP Architecture Engineering Planning

12/30/2020

TSP
1500 Highway 52 N
Rochester, MN 55901
phone (507) 288-8155
teamtsp.com

2023 COST ESTIMATE

PROBABLE CONSTRUCTION COST DETAIL

DATE: 05/27/22

PROJ: NCF Storm Shelter Updates Prototype 1 - Amended Above Ground — **2,161 sf**

LOC: Various Locations, Minnesota — **PROJECT NO:** 01210892 — **ESTIMATOR:** SLL

The amounts stated herein are our best estimate of probable construction costs based on current information. Because costs are influenced by market conditions, changes in project scope, and other factors beyond our control, we cannot guarantee that actual construction costs will equal this estimate.

DIV	DESCRIPTION	QUAN	UNITS	UNIT COST	TOTALS	SUB-TOTAL
01	**GENERAL REQUIREMENTS**					
	Misc. materials	2,161	sf	$ 3.56	$ 7,691.53	
	Rentals	1	lsum	$ 2,444.90	$ 2,444.90	
	Mobilize	1	lsum	$ 965.51	$ 965.51	
	Temp fencing	1	lsum	$ 4,431.39	$ 4,431.39	
	Small tools	1	lsum	$ 2,772.00	$ 2,772.00	
	Clean up	2,161	sf	$ 1.40	$ 3,021.67	
	Job supervision	2,161	sf	$ 18.88	$ 40,792.60	
	GC labor	2,161	sf	$ 0.69	$ 1,483.37	
	GC carpentry	2,161	sf	$ 1.07	$ 2,307.46	
	Dumpster/disposal	2,161	sf	$ 1.78	$ 3,857.11	
	Site survey	1	lsum	$ 2,182.95	$ 2,182.95	
	Vestibule structure, complete (70 sf)	1	lsum	$ 13,000.00	$ 13,000.00	
	GENERAL REQUIREMENTS - TOTAL			*$39.31 /sft*		$ 84,950.50
03	**CONCRETE**					
	Continuous strip footings	28	cy	$ 460.00	$ 12,880.00	
	Poured foundation walls	47	cy	$ 490.00	$ 23,030.00	
	S.O.G. Floors, 4"	1,911	sf	$ 7.37	$ 14,089.28	
	Topping - 4"	2,161	sf	$ 7.12	$ 15,383.07	
	Stoop cap	73	sf	$ 8.26	$ 603.17	
	Void form	65	sf	$ 4.93	$ 320.59	
	Precast					
	Hollow core roof deck - 12"	2,000	sf	$ 22.50	$ 45,000.00	
	CONCRETE - TOTAL			*$51.51 /sft*		$ 111,306.11
04	**MASONRY**					
	Concrete masonry units					
	8" CMU	2,000	sf	$ 28.69	$ 57,380.40	
	8" CMU, burnished	2,000	sf	$ 31.88	$ 63,756.00	
	2 1/2" rigid insulation	2,000	sf	$ 4.10	$ 8,196.44	
	MASONRY - TOTAL			*$59.85 /sft*		$ 129,332.84
05	**METALS**					
	Misc. Metals	2,161	sf	$ 1.60	$ 3,454.26	
	Canopy structure	73	sf	$ 38.71	$ 2,825.76	
	METALS - TOTAL			*$2.91 /sft*		$ 6,280.02
06	**WOOD, PLASTICS AND COMPOSITES**					
	Rough carpentry	2,161	sf	$ 4.26	$ 9,202.37	
	Finish carpentry	2,161	sf	$ 2.33	$ 5,036.12	
	Plastic laminate casework	15	lf	$ 509.74	$ 7,391.16	
	Solid surface tops	15	lf	$ 161.44	$ 2,421.56	
	WOOD, PLASTICS AND COMPOSITES - TOTAL			*$11.13 /sft*		$ 24,051.22
07	**THERMAL AND MOISTURE PROTECTION**					
	2" rigid below grade insulation	1,488	sf	$ 2.91	$ 4,327.72	
	Moisture barrier	1,900	sf	$ 3.69	$ 7,004.09	
	Membrane roofing w/insulation	2,161	sf	$ 18.96	$ 40,973.60	
	Canopy roof	73	sf	$ 10.69	$ 780.52	
	Roof vents	2,161	sf	$ 1.91	$ 4,120.47	
	Scupper & downspout	2	ea	$ 396.60	$ 793.20	
	Flashing & sheet metal	186	lf	$ 25.12	$ 4,671.97	
	Sealants	2,161	sf	$ 4.04	$ 8,723.79	
	Louver	1	ea	$ 1,960.20	$ 1,960.20	
	THERMAL AND MOISTURE PROTECTION - TOTAL			*$33.95 /sft*		$ 73,355.56

DIV	DESCRIPTION	QUAN	UNITS	UNIT COST	TOTALS	SUB-TOTAL
08	**OPENINGS**					
	HM doors/frames, 3' x 7' (exterior) UL windstorm	2	ea	$ 4,192.65	$ 8,385.30	
	Wood door, HM frames, 3' x 7' (interior)	3	ea	$ 1,650.00	$ 4,950.00	
	Wood door, HM frames, 6' x 7' (interior)	1	ea	$ 2,300.00	$ 2,300.00	
	Aluminum windows, 40" x 64", fixed	3	ea	$ 1,586.41	$ 4,759.22	
	Aluminum windows, 24" x 60", fixed	1	ea	$ 1,207.60	$ 1,207.60	
	Shutters, UL windstorm	4	ea	$ 4,791.60	$ 19,166.40	
	OPENINGS - TOTAL			*$18.87*	*/sft*	$ 40,768.53
09	**FINISHES**					
	Drywall systems (stl studs, hang & tape 2-sides)	900	sf	$ 12.85	$ 11,565.00	
	Drywall systems (stl studs, hang & tape 1-side)	176	sf	$ 9.75	$ 1,716.00	
	Armstrong "Invisacoustics" ceiling panels	552	sf	$ 22.95	$ 12,668.40	
	Ceiling tile systems	247	sf	$ 4.58	$ 1,130.32	
	Tile, walls	280	sf	$ 36.74	$ 10,286.23	
	Resilient base	480	lf	$ 2.65	$ 1,271.16	
	Sealed concrete	1,910	sf	$ 0.57	$ 1,092.56	
	Painting	2,161	sf	$ 4.14	$ 8,955.14	
	FINISHES- TOTAL			*$22.53*	*/sft*	$ 48,684.81
10	**SPECIALTIES**					
	Fire Extinguishers, wall mount	1	ea	$ 277.62	$ 277.62	
	Fire extinguisher cabinet & 10# ABC extinguisher	1	ea	$ 475.92	$ 475.92	
	First aid kit	1	ea	$ 127.12	$ 127.12	
	Signage	1	lsum	$ 600.00	$ 600.00	
	Corner guards	8	ea	$ 34.32	$ 274.57	
	Toilet & bath accessories					
	Grab bars	2	sets	$ 462.70	$ 925.40	
	Mirrors	2	ea	$ 171.61	$ 343.21	
	Towel dispensers	2	ea	$ 69.91	$ 139.83	
	T.P. dispensers	2	ea	$ 46.27	$ 92.54	
	Napkin	1	ea	$ 105.76	$ 105.76	
	Receptacles	2	ea	$ 330.50	$ 661.00	
	SS shelf	1	lsum	$ 635.58	$ 635.58	
	SPECIALTIES - TOTAL			*$2.16*	*/sft*	$ 4,658.56
21	**FIRE SUPPRESSION**					
	Fire sprinkler system	2,161	sf	$ 8.26	$ 17,855.35	
	FIRE SUPPRESSION - TOTAL			*$8.26*	*/sft*	$ 17,855.35
22	**PLUMBING**					
	Underslab rough-in	1	lsum	$ 4,200.00	$ 4,200.00	
	Floor drain	3	ea	$ 650.00	$ 1,950.00	
	Above slab rough-in	1	lsum	$ 2,600.00	$ 2,600.00	
	Fixtures					
	Toilets	2	ea	$ 2,800.00	$ 5,600.00	
	Wall lavs	2	ea	$ 2,100.00	$ 4,200.00	
	Stainless steel sink	1	ea	$ 1,500.00	$ 1,500.00	
	Water cooler, dual w/bottle filler	1	ea	$ 3,397.68	$ 3,397.68	
	Janitor sink	1	ea	$ 1,494.98	$ 1,494.98	
	Water heater	1	ea	$ 2,600.00	$ 2,600.00	
	Gas piping	1	lsum	$ 3,500.00	$ 3,500.00	
	PLUMBING - TOTAL			*$14.36*	*/sft*	$ 31,042.66
23	**HEATING VENTILATING AND AIR CONDITIONING**					
	HVAC system complete	2,161	sf	$ 60.54	$ 130,823.70	
	HVAC - TOTAL			*$60.54*	*/sft*	$ 130,823.70
26	**ELECTRICAL**					
	Electrical system complete	2,161	sf	$ 38.00	$ 82,118.00	
	ELECTRICAL - TOTAL			*$38.00*	*/sft*	$ 82,118.00
31	**EARTHWORK**					
	Demo existing underground shelter (approx. 20' x 30')	1	allow	$ 7,004.07	$ 7,004.07	
	Earthwork/grading	1	lsum	$ 9,533.70	$ 9,533.70	
	EARTHWORK - TOTAL			*$7.65*	*/sft*	$ 16,537.77
32	**EXTERIOR IMPROVEMENTS**					
	Sodding	1	lsum	$ 1,767.15	$ 1,767.15	
	Plantings	1	lsum	$ 2,182.95	$ 2,182.95	
	EARTHWORK - TOTAL			*$1.83*	*/sft*	$ 3,950.10

DIV	DESCRIPTION	QUAN	UNITS	UNIT COST	TOTALS	SUB-TOTAL
33	**UTILITIES**					
	Water Service, domestic	1	lsum	$ 9,043.65	$ 9,043.65	
	Fire service	1	lsum	$ 6,964.65	$ 6,964.65	
	UTILITIES - TOTAL			*$7.41*	*/sft*	$ 16,008.30

	SUB-TOTAL ESTIMATED CONSTRUCTION COST	Total
		$ 821,724.00

	GENERAL CONDITIONS					Total
	Estimating/Design Contingency	5.0%				$ 41,086.20
	General Conditions/OH	10.0%				$ 82,172.40
	Building Permit					$ 7,000.00
	Liability Insurance					$ -
	Builder's Risk Insurance	0.60%				$ 5,711.90
	GC/CM Profit	6.0%				$ 57,461.67
	Payment and Performance Bonds	1.65%				$ 16,750.08
	TOTAL ESTIMATED CONSTRUCTION COST	**NCF PROTOTYPE 1**				**$ 1,031,906.24**
	COST PER SQUARE FOOT					*$477.51*

ALTERNATE

Omit shutters and standard glass windows and provide hurricane/tornado resistant glass windows

Aluminum windows, 40" x 64", fixed, increased cost	3 ea	$ 540.00	$ 1,620.00	
Aluminum windows, 24" x 60", fixed, fixed, increased cost	1 ea	$ 300.00	$ 300.00	
Shutters, UL windstorm	(4) ea	$ 4,791.60	$ (19,166.40)	
			$ (17,246.40)	

DIV	DESCRIPTION	QUAN	UNITS	UNIT COST	TOTALS	SUB-TOTAL
08	**OPENINGS**					
	HM doors/frames, 3' x 7' (exterior) UL windstorm	2	ea	$ 4,318.43	$ 8,636.86	
	Wood door, HM frames, 3' x 7' (interior)	3	ea	$ 1,699.50	$ 5,098.50	
	Wood door, HM frames, 6' x 7' (interior)	1	ea	$ 2,369.00	$ 2,369.00	
	Aluminum windows, 40" x 64", fixed	3	ea	$ 1,634.00	$ 4,902.00	
	Aluminum windows, 24" x 60", fixed	1	ea	$ 1,243.83	$ 1,243.83	
	Shutters, UL windstorm	4	ea	$ 4,935.35	$ 19,741.39	
	OPENINGS - TOTAL			*$19.43*	*/sft*	$ 41,991.58
09	**FINISHES**					
	Drywall systems (stl studs, hang & tape 2-sides)	900	sf	$ 13.24	$ 11,911.95	
	Drywall systems (stl studs, hang & tape 1-side)	176	sf	$ 10.04	$ 1,767.48	
	Armstrong "Invisacoustics" ceiling panels	552	sf	$ 23.64	$ 13,048.45	
	Ceiling tile systems	247	sf	$ 4.71	$ 1,164.22	
	Tile, walls	280	sf	$ 37.84	$ 10,594.81	
	Resilient base	480	lf	$ 2.73	$ 1,309.29	
	Sealed concrete	1,910	sf	$ 0.59	$ 1,125.34	
	Painting	2,161	sf	$ 4.27	$ 9,223.80	
	FINISHES- TOTAL			*$23.20*	*/sft*	$ 50,145.35
10	**SPECIALTIES**					
	Fire Extinguishers, wall mount	1	ea	$ 285.95	$ 285.95	
	Fire extinguisher cabinet & 10# ABC extinguisher	1	ea	$ 490.20	$ 490.20	
	First aid kit	1	ea	$ 130.93	$ 130.93	
	Signage	1	lsum	$ 618.00	$ 618.00	
	Corner guards	8	ea	$ 35.35	$ 282.81	
	Toilet & bath accessories					
	Grab bars	2	sets	$ 476.58	$ 953.17	
	Mirrors	2	ea	$ 176.75	$ 353.51	
	Towel dispensers	2	ea	$ 72.01	$ 144.02	
	T.P. dispensers	2	ea	$ 47.66	$ 95.32	
	Napkin	1	ea	$ 108.93	$ 108.93	
	Receptacles	2	ea	$ 340.42	$ 680.83	
	SS shelf	1	lsum	$ 654.65	$ 654.65	
	SPECIALTIES - TOTAL			*$2.22*	*/sft*	$ 4,798.32
21	**FIRE SUPPRESSION**					
	Fire sprinkler system	2,161	sf	$ 8.51	$ 18,391.01	
	FIRE SUPPRESSION - TOTAL			*$8.51*	*/sft*	$ 18,391.01
22	**PLUMBING**					
	Underslab rough-in	1	lsum	$ 4,368.00	$ 4,368.00	
	Floor drain	3	ea	$ 676.00	$ 2,028.00	
	Above slab rough-in	1	lsum	$ 2,704.00	$ 2,704.00	
	Fixtures					
	Toilets	2	ea	$ 2,912.00	$ 5,824.00	
	Wall lavs	2	ea	$ 2,184.00	$ 4,368.00	
	Stainless steel sink	1	ea	$ 1,560.00	$ 1,560.00	
	Water cooler, dual w/bottle filler	1	ea	$ 3,533.59	$ 3,533.59	
	Janitor sink	1	ea	$ 1,554.78	$ 1,554.78	
	Water heater	1	ea	$ 2,704.00	$ 2,704.00	
	Gas piping	1	lsum	$ 3,640.00	$ 3,640.00	
	PLUMBING - TOTAL			*$14.94*	*/sft*	$ 32,284.37
23	**HEATING VENTILATING AND AIR CONDITIONING**					
	HVAC system complete	2,161	sf	$ 64.17	$ 138,671.37	
	HVAC - TOTAL			*$64.17*	*/sft*	$ 138,671.37
26	**ELECTRICAL**					
	Electrical system complete	2,161	sf	$ 40.28	$ 87,045.08	
	ELECTRICAL - TOTAL			*$40.28*	*/sft*	$ 87,045.08
31	**EARTHWORK**					
	Demo existing underground shelter (approx. 20' x 30')	1	allow	$ 7,214.19	$ 7,214.19	
	Earthwork/grading	1	lsum	$ 9,819.71	$ 9,819.71	
	EARTHWORK - TOTAL			*$7.88*	*/sft*	$ 17,033.90
32	**EXTERIOR IMPROVEMENTS**					
	Sodding	1	lsum	$ 1,820.16	$ 1,820.16	
	Plantings	1	lsum	$ 2,248.44	$ 2,248.44	
	EARTHWORK - TOTAL			*$1.88*	*/sft*	$ 4,068.60

DIV	DESCRIPTION	QUAN	UNITS	UNIT COST	TOTALS	SUB-TOTAL
33	**UTILITIES**					
	Water Service, domestic	1	lsum	$ 9,314.96	$ 9,314.96	
	Fire service	1	lsum	$ 7,173.59	$ 7,173.59	
	UTILITIES - TOTAL			*$7.63*	*/sft*	$ 16,488.55

	SUB-TOTAL ESTIMATED CONSTRUCTION COST					Total
						$ 855,845.15

	GENERAL CONDITIONS					Total
	Estimating/Design Contingency	5.0%				$ 42,792.26
	General Conditions/OH	10.0%				$ 85,584.52
	Building Permit					$ 7,000.00
	Liability Insurance					$ -
	Builder's Risk Insurance	0.60%				$ 5,947.33
	GC/CM Profit	6.0%				$ 59,830.16
	Payment and Performance Bonds	1.65%				$ 17,440.49

	TOTAL ESTIMATED CONSTRUCTION COST	NCF PROTOTYPE 1				$ 1,074,439.90
	COST PER SQUARE FOOT					*$497.20*

ALTERNATE

Omit shutters and standard glass windows and provide hurricane/tornado resistant glass windows

Aluminum windows, 40" x 64", fixed, increased cost	3 ea	$ 540.00	$ 1,620.00	
Aluminum windows, 24" x 60", fixed, fixed, increased cost	1 ea	$ 300.00	$ 300.00	
Shutters, UL windstorm	(4) ea	$ 4,935.35	$ (19,741.39)	
			$ (17,821.39)	

PROTOTYPE #2 – PARTIALLY EARTH PROTECTED

Overview

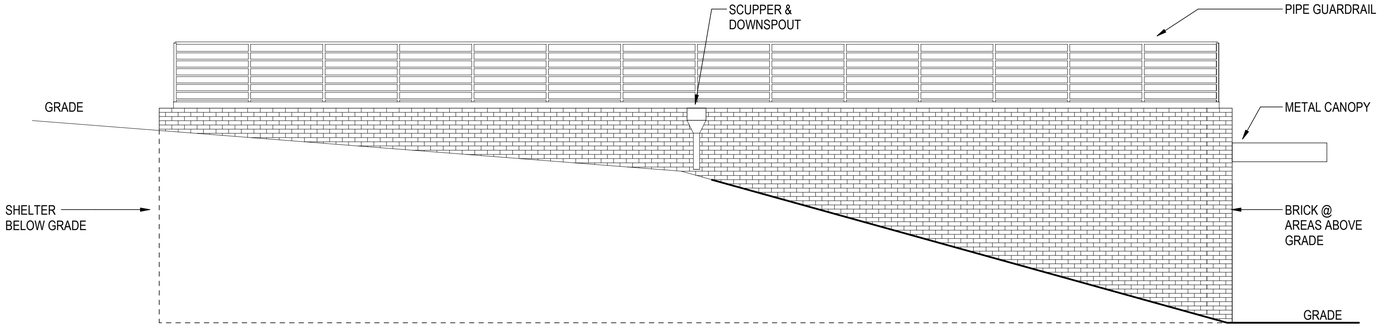
The partially earth protected prototype looks to take advantage of bermed earth to help provide the required storm protection. This option is not as easily adaptable to multiple sites without additional cost, but certainly works well on sites that we can leverage an existing hill.

Due to the nature that the roof of the structure would be easily accessible to the public, we would be required to provide a railing on the roof but would also provide the opportunity for a 'roof top' style patio – but as with anything – comes with a cost!

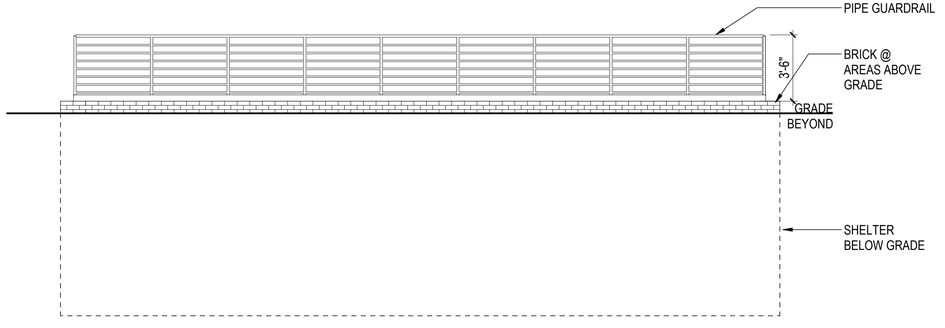
As with Prototype #1 - The shelter is a dual-use facility programmed for use as a community room space along with providing protection against tornadoes in the case of emergency. This provides efficiencies in space but may result in higher costs as compared to a standalone shelter (no community function) because of size and level of finish.

EXTERIOR ELEVATIONS - PROTOTYPE #2

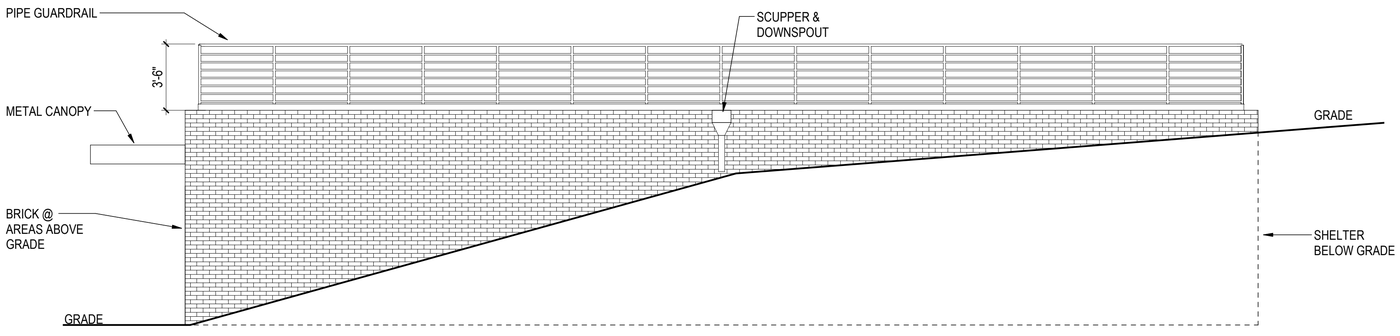
BERMED EARTH



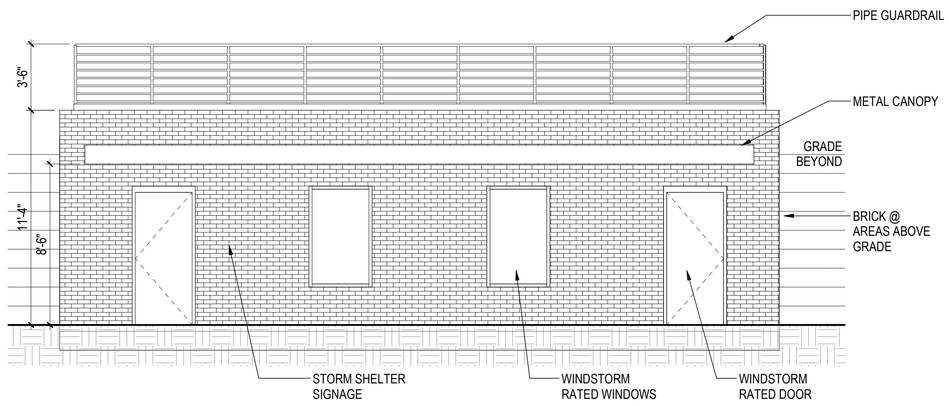
C **WEST ELEVATION - PROTOTYPE #2**
SCALE: 1/4" = 1'-0"



D **NORTH ELEVATION - PROTOTYPE #2**
SCALE: 1/4" = 1'-0"



A **EAST ELEVATION - PROTOTYPE #2**
SCALE: 1/4" = 1'-0"



B **SOUTH ELEVATION - PROTOTYPE #2**
SCALE: 1/4" = 1'-0"

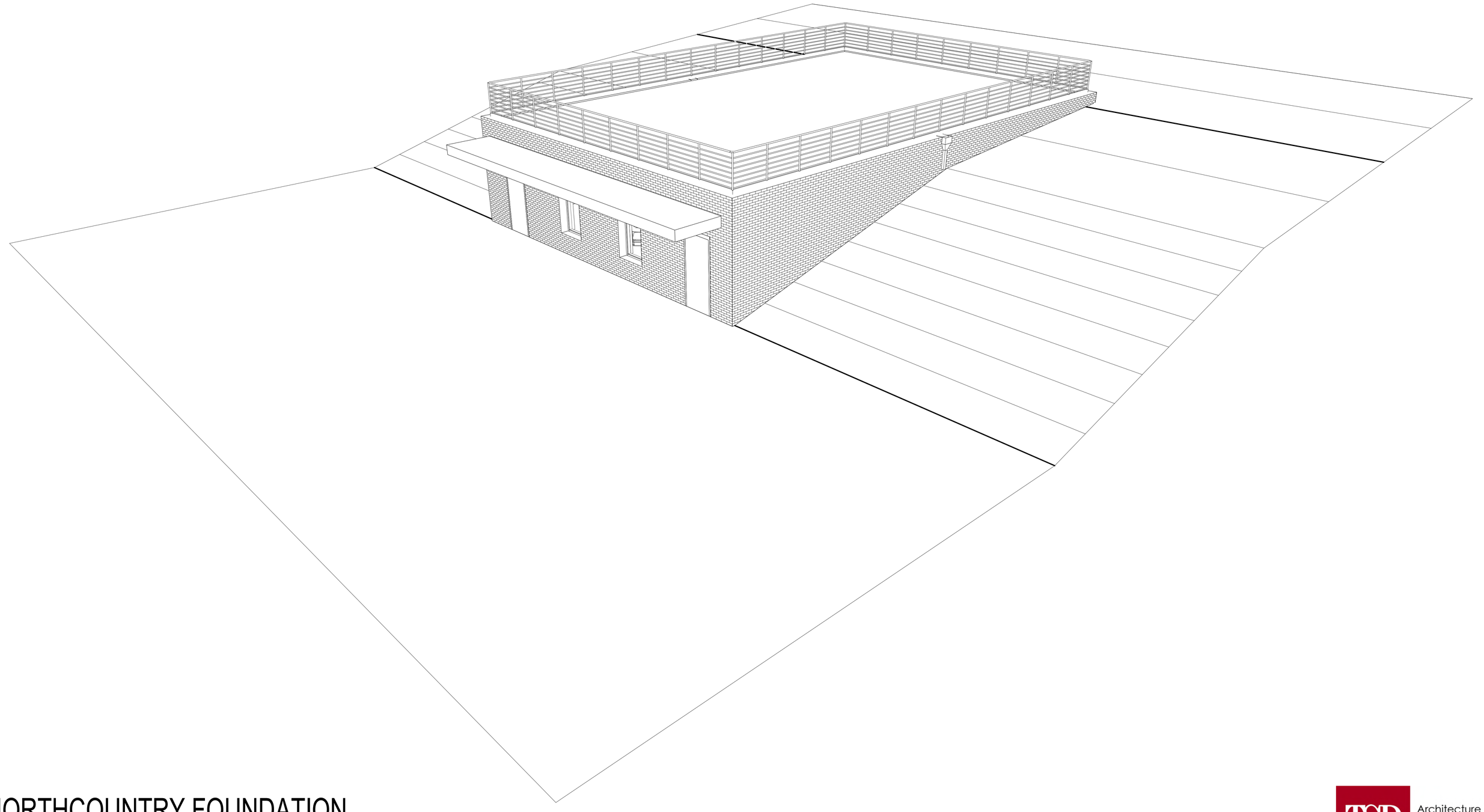
NORTHCOUNTRY FOUNDATION
SHELTER PROTOTYPE REDESIGN

TSP Architecture Engineering Planning

07/26/21

3D PERSPECTIVE - PROTOTYPE #2

BERMED EARTH



NORTHCOUNTRY FOUNDATION
SHELTER PROTOTYPE REDESIGN

TSP Architecture Engineering Planning

TSP
1500 Highway 52 N
Rochester, MN 55901
phone (507) 288-8155
teamtsp.com

2023 COST ESTIMATE

PROBABLE CONSTRUCTION COST DETAIL

DATE: 05/27/22

PROJ: NCF Storm Shelter Updates Prototype 2 - Partially Earth Protected — **2,153 sf**

LOC: Various Locations, Minnesota — **PROJECT NO:** 01210892 — **ESTIMATOR:** SLL

The amounts stated herein are our best estimate of probable construction costs based on current information. Because costs are influenced by market conditions, changes in project scope, and other factors beyond our control, we cannot guarantee that actual construction costs will equal this estimate.

DIV	DESCRIPTION	QUAN	UNITS	UNIT COST	TOTALS	SUB-TOTAL
01	**GENERAL REQUIREMENTS**					
	Misc. materials	2,153	sf	$ 3.56	$ 7,663.06	
	Rentals	1	lsum	$ 2,444.90	$ 2,444.90	
	Mobilize	1	lsum	$ 965.51	$ 965.51	
	Temp fencing	1	lsum	$ 4,431.39	$ 4,431.39	
	Small tools	1	lsum	$ 2,772.00	$ 2,772.00	
	Clean up	2,153	sf	$ 1.40	$ 3,010.49	
	Job supervision	2,153	sf	$ 18.88	$ 40,641.59	
	GC labor	2,153	sf	$ 0.69	$ 1,477.88	
	GC carpentry	2,153	sf	$ 1.07	$ 2,298.92	
	Dumpster/disposal	2,153	sf	$ 1.78	$ 3,842.83	
	Site survey	1	lsum	$ 2,182.95	$ 2,182.95	
	Vestibule structure, complete (70 sf)	1	lsum	$ 13,000.00	$ 13,000.00	
	GENERAL REQUIREMENTS - TOTAL					$ 84,731.51
03	**CONCRETE**					
	Continuous strip footings	30	cy	$ 460.00	$ 13,800.00	
	Poured foundation walls	38	cy	$ 490.00	$ 18,620.00	
	S.O.G. Floors, 4"	1,911	sf	$ 7.37	$ 14,089.28	
	Topping - 4"	2,153	sf	$ 7.12	$ 15,326.12	
	Stoop cap	73	sf	$ 8.26	$ 603.17	
	Void form	65	sf	$ 4.93	$ 320.59	
	Precast					
	Hollow core roof deck - 12"	2,000	sf	$ 22.50	$ 45,000.00	
	CONCRETE - TOTAL					$ 107,759.16
04	**MASONRY**					
	Concrete masonry units					
	8" CMU	3,130	sf	$ 28.69	$ 89,800.33	
	Brick veneer	870	sf	$ 33.05	$ 28,753.64	
	2 1/2" rigid insulation	2,000	sf	$ 4.10	$ 8,196.44	
	MASONRY - TOTAL					$ 126,750.40
05	**METALS**					
	Misc. Metals	2,153	sf	$ 1.60	$ 3,441.47	
	Canopy structure	143	sf	$ 38.71	$ 5,535.39	
	Steel guardrail	190	lf	$ 239.09	$ 45,426.15	
	METALS - TOTAL					$ 54,403.01
06	**WOOD, PLASTICS AND COMPOSITES**					
	Rough carpentry	2,153	sf	$ 4.26	$ 9,168.31	
	Finish carpentry	2,153	sf	$ 2.33	$ 5,017.48	
	Plastic laminate casework	15	lf	$ 509.74	$ 7,391.16	
	Solid surface tops	15	lf	$ 161.44	$ 2,421.56	
	WOOD, PLASTICS AND COMPOSITES - TOTAL					$ 23,998.51
07	**THERMAL AND MOISTURE PROTECTION**					
	2" rigid below grade insulation	1,600	sf	$ 2.91	$ 4,653.46	
	Foundation waterproofing	1,600	sf	$ 6.99	$ 11,186.21	
	Moisture barrier	1,000	sf	$ 3.69	$ 3,686.36	
	Membrane roofing w/insulation	2,153	sf	$ 18.96	$ 40,821.91	
	Canopy roof	143	sf	$ 10.69	$ 1,528.96	
	Concrete pavers	1,900	sf	$ 19.36	$ 36,792.36	
	Roof vents	2,153	sf	$ 1.91	$ 4,105.21	
	Scupper & downspout	2	ea	$ 396.60	$ 793.20	
	Flashing & sheet metal	186	lf	$ 25.12	$ 4,671.97	
	Sealants	2,153	sf	$ 4.04	$ 8,691.50	
	Louver	1	ea	$ 1,960.20	$ 1,960.20	
	THERMAL AND MOISTURE PROTECTION - TOTAL					$ 118,891.34

DIV	DESCRIPTION	QUAN	UNITS	UNIT COST	TOTALS	SUB-TOTAL
33	**UTILITIES**					
	Water Service, domestic	1	lsum	$ 9,043.65	$ 9,043.65	
	Fire service	1	lsum	$ 6,964.65	$ 6,964.65	
	UTILITIES - TOTAL					$ 16,008.30

	SUB-TOTAL ESTIMATED CONSTRUCTION COST	Total
		$ 923,418.92

	GENERAL CONDITIONS					Total
	Estimating/Design Contingency	5.0%				$ 46,170.95
	General Conditions/OH	10.0%				$ 92,341.89
	Building Permit					$ 7,500.00
	Liability Insurance					$ -
	Builder's Risk Insurance	0.60%				$ 6,416.59
	GC/CM Profit	6.0%				$ 64,550.90
	Payment and Performance Bonds	1.65%				$ 18,816.59
	TOTAL ESTIMATED CONSTRUCTION COST	**NCF PROTOTYPE 2**				**$ 1,159,215.83**
	COST PER SQUARE FOOT					*$538.42*

ALTERNATE

Omit shutters and standard glass windows and provide hurricane/tornado resistant glass windows

Aluminum windows, 40" x 64", fixed, increased cost	2 ea	$ 540.00	$ 1,080.00	
Shutters, UL windstorm	(2) ea	$ 4,791.60	$ (9,583.20)	
			$ (8,503.20)	

TSP
1500 Highway 52 N
Rochester, MN 55901
phone (507) 288-8155
teamtsp.com

2024 COST ESTIMATE

PROBABLE CONSTRUCTION COST DETAIL

DATE: 05/27/22

PROJ: NCF Storm Shelter Updates Prototype 2 - Partially Earth Protected — **2,153 sf**

LOC: Various Locations, Minnesota — **PROJECT NO:** 01210892 — **ESTIMATOR:** SLL

The amounts stated herein are our best estimate of probable construction costs based on current information. Because costs are influenced by market conditions, changes in project scope, and other factors beyond our control, we cannot guarantee that actual construction costs will equal this estimate.

DIV	DESCRIPTION	QUAN	UNITS	UNIT COST	TOTALS	SUB-TOTAL
01	**GENERAL REQUIREMENTS**					
	Misc. materials	2,153	sf	$ 3.67	$ 7,892.95	
	Rentals	1	lsum	$ 2,518.25	$ 2,518.25	
	Mobilize	1	lsum	$ 994.47	$ 994.47	
	Temp fencing	1	lsum	$ 4,564.33	$ 4,564.33	
	Small tools	1	lsum	$ 2,855.16	$ 2,855.16	
	Clean up	2,153	sf	$ 1.44	$ 3,100.80	
	Job supervision	2,153	sf	$ 19.44	$ 41,860.84	
	GC labor	2,153	sf	$ 0.71	$ 1,522.21	
	GC carpentry	2,153	sf	$ 1.10	$ 2,367.89	
	Dumpster/disposal	2,153	sf	$ 1.84	$ 3,958.11	
	Site survey	1	lsum	$ 2,248.44	$ 2,248.44	
	Vestibule structure, complete (70 sf)	1	lsum	$ 13,390.00	$ 13,390.00	
	GENERAL REQUIREMENTS - TOTAL					$ 87,273.46
03	**CONCRETE**					
	Continuous strip footings	30	cy	$ 478.40	$ 14,352.00	
	Poured foundation walls	38	cy	$ 509.60	$ 19,364.80	
	S.O.G. Floors, 4"	1,911	sf	$ 7.67	$ 14,652.85	
	Topping - 4"	2,153	sf	$ 7.40	$ 15,939.17	
	Stoop cap	73	sf	$ 8.59	$ 627.29	
	Void form	65	sf	$ 5.13	$ 333.41	
	Precast					
	Hollow core roof deck - 12"	2,000	sf	$ 23.40	$ 46,800.00	
	CONCRETE - TOTAL					$ 112,069.52
04	**MASONRY**					
	Concrete masonry units					
	8" CMU	3,130	sf	$ 29.84	$ 93,392.34	
	Brick veneer	870	sf	$ 34.37	$ 29,903.78	
	2 1/2" rigid insulation	2,000	sf	$ 4.26	$ 8,524.30	
	MASONRY - TOTAL					$ 131,820.42
05	**METALS**					
	Misc. Metals	2,153	sf	$ 1.68	$ 3,613.55	
	Canopy structure	143	sf	$ 40.64	$ 5,812.16	
	Steel guardrail	190	lf	$ 251.04	$ 47,697.46	
	METALS - TOTAL					$ 57,123.16
06	**WOOD, PLASTICS AND COMPOSITES**					
	Rough carpentry	2,153	sf	$ 4.43	$ 9,535.04	
	Finish carpentry	2,153	sf	$ 2.42	$ 5,218.18	
	Plastic laminate casework	15	lf	$ 530.12	$ 7,686.81	
	Solid surface tops	15	lf	$ 167.89	$ 2,518.42	
	WOOD, PLASTICS AND COMPOSITES - TOTAL					$ 24,958.45
07	**THERMAL AND MOISTURE PROTECTION**					
	2" rigid below grade insulation	1,600	sf	$ 3.00	$ 4,793.07	
	Foundation waterproofing	1,600	sf	$ 7.20	$ 11,521.79	
	Moisture barrier	1,000	sf	$ 3.80	$ 3,796.95	
	Membrane roofing w/insulation	2,153	sf	$ 19.53	$ 42,046.57	
	Canopy roof	143	sf	$ 11.01	$ 1,574.82	
	Concrete pavers	1,900	sf	$ 19.95	$ 37,896.13	
	Roof vents	2,153	sf	$ 1.96	$ 4,228.37	
	Scupper & downspout	2	ea	$ 408.50	$ 817.00	
	Flashing & sheet metal	186	lf	$ 25.87	$ 4,812.13	
	Sealants	2,153	sf	$ 4.16	$ 8,952.24	
	Louver	1	ea	$ 2,019.01	$ 2,019.01	
	THERMAL AND MOISTURE PROTECTION - TOTAL					$ 122,458.09

DIV	DESCRIPTION	QUAN	UNITS	UNIT COST	TOTALS	SUB-TOTAL
08	**OPENINGS**					
	HM doors/frames, 3' x 7' (exterior) UL windstorm	3	ea	$ 4,318.43	$ 12,955.29	
	Wood door, HM frames, 3' x 7' (interior)	3	ea	$ 1,699.50	$ 5,098.50	
	Wood door, HM frames, 6' x 7' (interior)	1	ea	$ 2,369.00	$ 2,369.00	
	Aluminum windows, 40" x 64", fixed	2	ea	$ 1,634.00	$ 3,268.00	
	Aluminum windows, 24" x 60", fixed		ea	$ 1,243.83	$ -	
	Shutters, UL windstorm	2	ea	$ 4,935.35	$ 9,870.70	
	OPENINGS - TOTAL					$ 33,561.48
09	**FINISHES**					
	Drywall systems (stl studs, hang & tape 2-sides)	900	sf	$ 13.24	$ 11,911.95	
	Drywall systems (stl studs, hang & tape 1-side)	176	sf	$ 10.04	$ 1,767.48	
	Armstrong "Invisacoustics" ceiling panels	552	sf	$ 23.64	$ 13,048.45	
	Ceiling tile systems	247	sf	$ 4.71	$ 1,164.22	
	Tile, walls	280	sf	$ 37.84	$ 10,594.81	
	Resilient base	480	lf	$ 2.73	$ 1,309.29	
	Sealed concrete	1,910	sf	$ 0.59	$ 1,125.34	
	Painting	2,153	sf	$ 4.27	$ 9,189.65	
	FINISHES- TOTAL					$ 50,111.21
10	**SPECIALTIES**					
	Fire Extinguishers, wall mount	1	ea	$ 285.95	$ 285.95	
	Fire extinguisher cabinet & 10# ABC extinguisher	1	ea	$ 490.20	$ 490.20	
	First aid kit	1	ea	$ 130.93	$ 130.93	
	Signage	1	lsum	$ 618.00	$ 618.00	
	Corner guards	8	ea	$ 35.35	$ 282.81	
	Toilet & bath accessories					
	Grab bars	2	sets	$ 476.58	$ 953.17	
	Mirrors	2	ea	$ 176.75	$ 353.51	
	Towel dispensers	2	ea	$ 72.01	$ 144.02	
	T.P. dispensers	2	ea	$ 47.66	$ 95.32	
	Napkin	1	ea	$ 108.93	$ 108.93	
	Receptacles	2	ea	$ 340.42	$ 680.83	
	SS shelf	1	lsum	$ 654.65	$ 654.65	
	SPECIALTIES - TOTAL					$ 4,798.32
21	**FIRE SUPPRESSION**					
	Fire sprinkler system	2,153	sf	$ 8.59	$ 18,500.82	
	FIRE SUPPRESSION - TOTAL			$ -		$ 18,500.82
				$ -		
22	**PLUMBING**					
	Underslab rough-in	1	lsum	$ 4,368.00	$ 4,368.00	
	Floor drain	3	ea	$ 676.00	$ 2,028.00	
	Above slab rough-in	1	lsum	$ 2,704.00	$ 2,704.00	
	Fixtures					
	Toilets	2	ea	$ 2,912.00	$ 5,824.00	
	Wall lavs	2	ea	$ 2,184.00	$ 4,368.00	
	Stainless steel sink	1	ea	$ 1,560.00	$ 1,560.00	
	Water cooler, dual w/bottle filler	1	ea	$ 3,533.59	$ 3,533.59	
	Janitor sink	1	ea	$ 1,554.78	$ 1,554.78	
	Water heater	1	ea	$ 2,704.00	$ 2,704.00	
	Gas piping	1	lsum	$ 3,640.00	$ 3,640.00	
	PLUMBING - TOTAL					$ 32,284.37
23	**HEATING VENTILATING AND AIR CONDITIONING**					
	HVAC system complete	2,153	sf	$ 64.17	$ 138,159.75	
	HVAC - TOTAL					$ 138,159.75
26	**ELECTRICAL**					
	Electrical system complete	2,153	sf	$ 40.28	$ 86,722.84	
	ELECTRICAL - TOTAL					$ 86,722.84
31	**EARTHWORK**					
	Demo existing underground shelter (approx. 20' x 30')	1	allow	$ 7,214.19	$ 7,214.19	
	Earthwork/grading, drain tile system	1	lsum	$ 32,732.37	$ 32,732.37	
	EARTHWORK - TOTAL					$ 39,946.56
32	**EXTERIOR IMPROVEMENTS**					
	Sodding	1	lsum	$ 3,212.06	$ 3,212.06	
	Plantings	1	lsum	$ 2,158.50	$ 2,158.50	
	EARTHWORK - TOTAL					$ 5,370.56

PROTOTYPE #3 – COMMUNITY ROOM WITH SHELTER BELOW

Overview

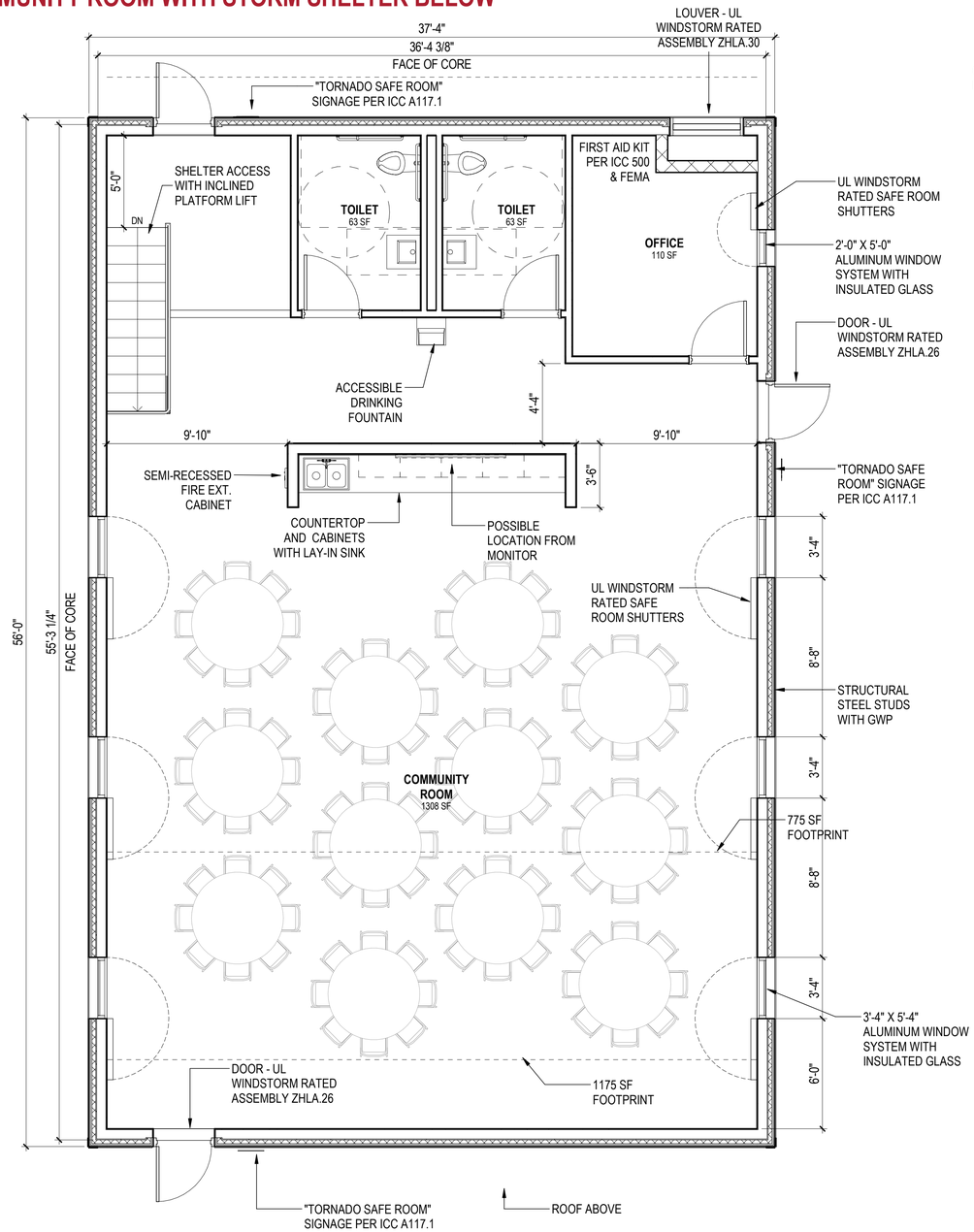
This prototype puts a dedicated storm shelter below ground and builds a standard construction community room above. In the case of storm, residents would take refuge below with the potential that the community room above could be lost.

This approach seeks to find efficiencies in cost by making the storm shelter portion right-sized (not so large) and to reduce cost for construction on the community, comparatively, to the above ground storm shelter option.

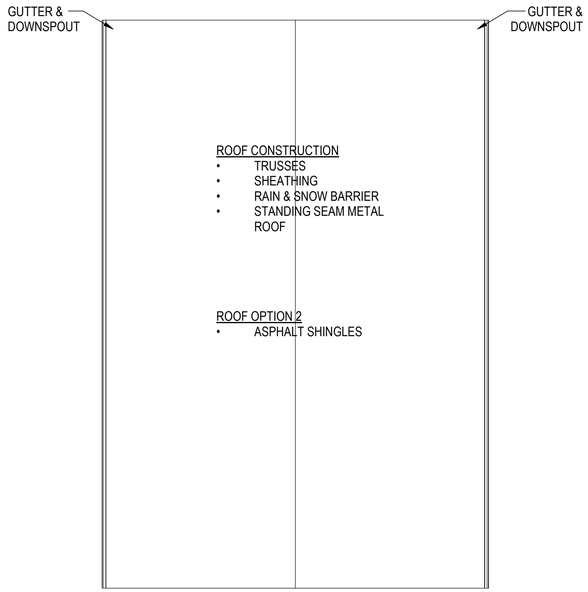
Accessibility is still an issue as a community would need to make sure all residents are able to have access. This would require an elevator or a lift, which adds cost and ongoing maintenance needs. Also, a portion of the above round would still be required to be storm rated at the place of entrance into the shelter. This could be a room, as reflected in the floorplan, or could be a hatch in a room. We also would be required to provide bathrooms in the shelter area that would rarely get used.

PLANS - PROTOTYPE #3

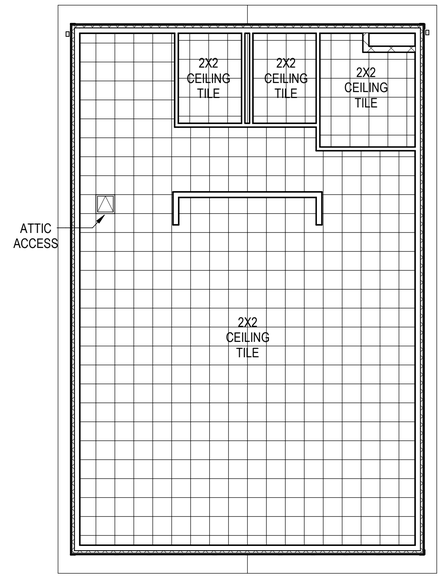
COMMUNITY ROOM WITH STORM SHELTER BELOW



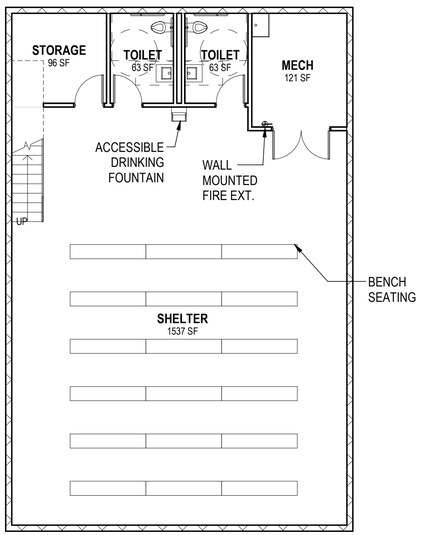
A **FIRST LEVEL FLOOR PLAN - PROTOYPE #3**
SCALE: 1/4" = 1'-0"



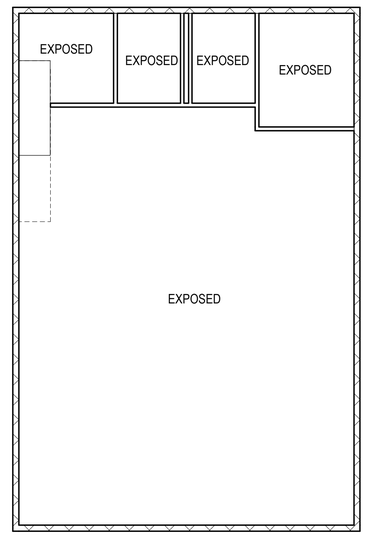
D **ROOF PLAN - PROTOYPE #3**
SCALE: 1/8" = 1'-0"



E **FIRST LEVEL CEILING PLAN - PROTOYPE #3**
SCALE: 1/8" = 1'-0"



B **SHELTER LEVEL - PROTOYPE #3**
SCALE: 1/8" = 1'-0"



C **SHELTER LEVEL CEILING PLAN - PROTOYPE #3**
SCALE: 1/8" = 1'-0"

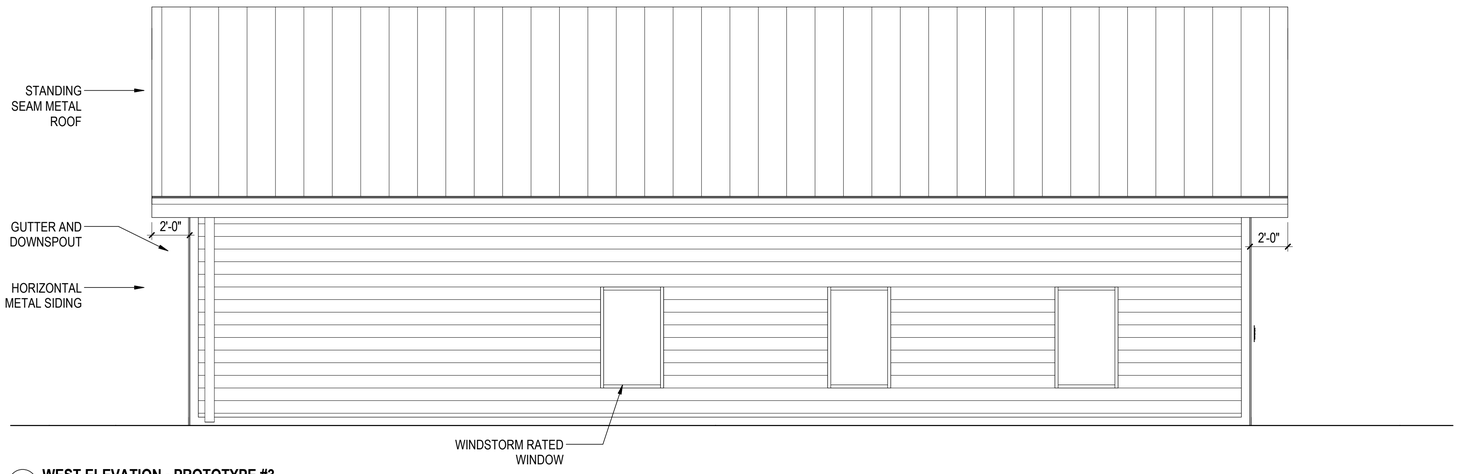
NORTHCOUNTRY FOUNDATION
SHELTER PROTOTYPE REDESIGN

TSP Architecture Engineering Planning

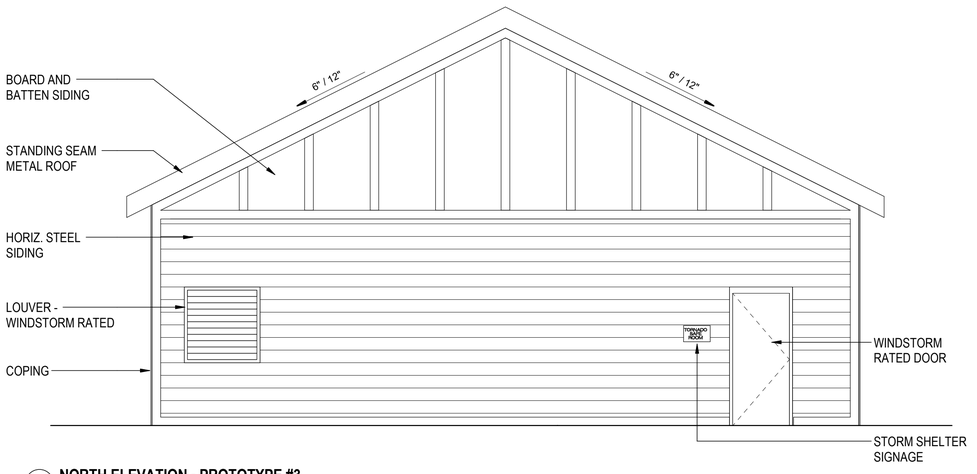
07/26/21

EXTERIOR ELEVATIONS - PROTOTYPE #3

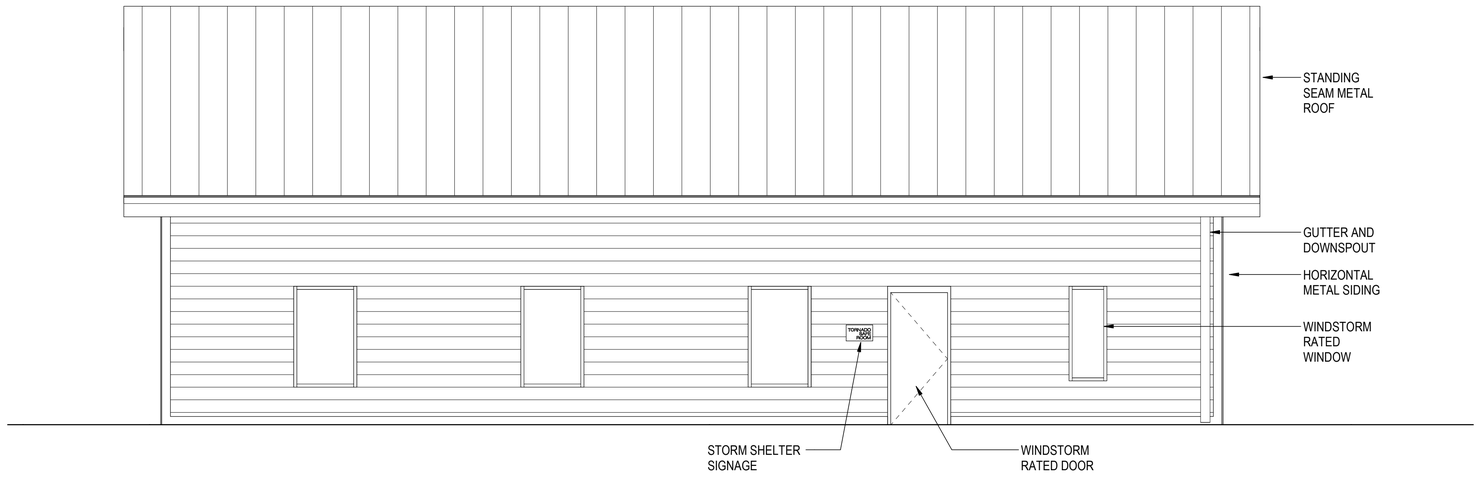
COMMUNITY ROOM WITH STORM SHELTER BELOW



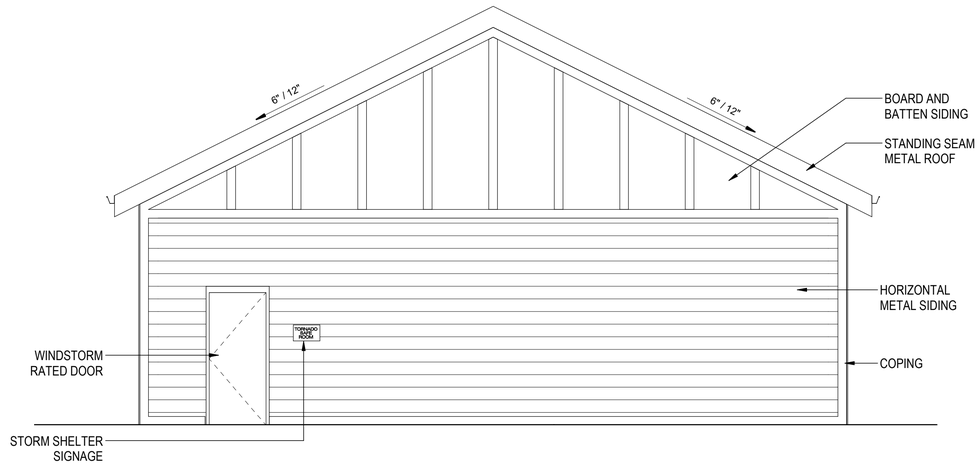
C **WEST ELEVATION - PROTOTYPE #3**
SCALE: 1/4" = 1'-0"



D **NORTH ELEVATION - PROTOTYPE #3**
SCALE: 1/4" = 1'-0"



A **EAST ELEVATION - PROTOTYPE #3**
SCALE: 1/4" = 1'-0"



B **SOUTH ELEVATION - PROTOTYPE #3**
SCALE: 1/4" = 1'-0"

NORTHCOUNTRY FOUNDATION
SHELTER PROTOTYPE REDESIGN

TSP Architecture Engineering Planning

07/26/21

TSP
1500 Highway 52 N
Rochester, MN 55901
phone (507) 288-8155
teamtsp.com

2023 COST ESTIMATE

PROBABLE CONSTRUCTION COST DETAIL

DATE: 05/27/22

PROJ: NCF Storm Shelter Updates Prototype 3 - Community Room with Shelter Below — **2,090 sf**

LOC: Various Locations, Minnesota — **PROJECT NO:** 01210892 — **ESTIMATOR:** SLL

The amounts stated herein are our best estimate of probable construction costs based on current information. Because costs are influenced by market conditions, changes in project scope, and other factors beyond our control, we cannot guarantee that actual construction costs will equal this estimate.

DIV	DESCRIPTION	QUAN	UNITS	UNIT COST	TOTALS	SUB-TOTAL
01	**GENERAL REQUIREMENTS**					
	Misc. materials	2,090	sf	$ 3.56	$ 7,438.83	
	Rentals	1	lsum	$ 2,444.90	$ 2,444.90	
	Mobilize	1	lsum	$ 965.51	$ 965.51	
	Temp fencing	1	lsum	$ 4,431.39	$ 4,431.39	
	Small tools	1	lsum	$ 2,772.00	$ 2,772.00	
	Clean up	2,090	sf	$ 1.40	$ 2,922.40	
	Job supervision	2,090	sf	$ 18.88	$ 39,452.36	
	GC labor	2,090	sf	$ 0.69	$ 1,434.63	
	GC carpentry	2,090	sf	$ 1.07	$ 2,231.65	
	Dumpster/disposal	2,090	sf	$ 1.78	$ 3,730.38	
	Site survey	1	lsum	$ 2,182.95	$ 2,182.95	
	Vestibule structure, complete (70 sf)	1	lsum	$ 13,000.00	$ 13,000.00	
	GENERAL REQUIREMENTS - TOTAL					$ 83,006.99
03	**CONCRETE**					
	Continuous strip footings	20	cy	$ 460.00	$ 9,200.00	
	Poured foundation walls	26	cy	$ 490.00	$ 12,740.00	
	S.O.G. Floors, 4"	1,915	sf	$ 7.37	$ 14,118.77	
	Add for ramp	32	sf	$ 7.12	$ 227.79	
	Stoop cap	73	sf	$ 8.26	$ 603.17	
	Void form	65	sf	$ 4.93	$ 320.59	
	CONCRETE - TOTAL					$ 37,210.32
04	**MASONRY**					
	8" CMU		sf	$ 28.69	$ -	
	MASONRY - TOTAL					$ -
05	**METALS**					
	Misc. Metals	2,090	sf	$ 1.25	$ 2,617.41	
	Canopy structure		sf	$ 38.71	$ -	
	Stairs to attic access door	1	lsum	$ 2,504.70	$ 2,504.70	
	METALS - TOTAL					$ 5,122.11
06	**WOOD, PLASTICS AND COMPOSITES**					
	Rough carpentry	2,090	sf	$ 3.60	$ 7,527.39	
	Wood roof truss system and soffit framing	2,250	sf	$ 7.03	$ 15,825.94	
	Roof sheathing	2,500	sf	$ 4.14	$ 10,345.50	
	Finish carpentry	2,090	sf	$ 2.40	$ 5,007.22	
	Plastic laminate casework	15	lf	$ 524.03	$ 7,598.39	
	Solid surface tops	15	lf	$ 165.96	$ 2,489.45	
	WOOD, PLASTICS AND COMPOSITES - TOTAL					$ 48,793.89
07	**THERMAL AND MOISTURE PROTECTION**					
	2" rigid below grade insulation	1,560	sf	$ 2.91	$ 4,537.13	
	Moisture barrier	2,020	sf	$ 3.69	$ 7,446.46	
	Rigid insulation	2,020	sf	$ 3.48	$ 7,039.30	
	Attic insulation	2,090	sf	$ 1.96	$ 4,096.82	
	Metal roof and flashing, standing seam	2,500	sf	$ 28.31	$ 70,785.00	
	Metal siding over furring strips, B&B	2,400	sf	$ 12.00	$ 28,800.00	
	Soffits	168	sf	$ 17.42	$ 2,927.23	
	Roof vents	1	lsum	$ 653.40	$ 653.40	
	Gutter & downspout	146	lf	$ 13.07	$ 1,907.93	
	Sealants	2,090	sf	$ 4.04	$ 8,437.17	
	Louver	1	ea	$ 1,960.20	$ 1,960.20	
	THERMAL AND MOISTURE PROTECTION - TOTAL					$ 138,590.62

DIV	DESCRIPTION	QUAN	UNITS	UNIT COST	TOTALS	SUB-TOTAL
08	**OPENINGS**					
	HM doors/frames, 3' x 7' (exterior) UL windstorm	2	ea	$ 4,192.65	$ 8,385.30	
	HM doors/frames, 3' x 7' (exterior)	1	ea	$ 1,906.74	$ 1,906.74	
	Wood door, HM frames, 3' x 7' (interior)	3	ea	$ 1,650.00	$ 4,950.00	
	Wood door, HM frames, 6' x 7' (interior)	1	ea	$ 2,300.00	$ 2,300.00	
	Aluminum windows, 40" x 64", fixed	6	ea	$ 1,586.41	$ 9,518.45	
	Aluminum windows, 24" x 60", fixed	1	ea	$ 1,207.60	$ 1,207.60	
	Shutters, UL windstorm	7	ea	$ 4,791.60	$ 33,541.20	
	OPENINGS - TOTAL					$ 61,809.29
09	**FINISHES**					
	Exterior wall framing (heavy stl studs, gyp sheathing)	2,618	sf	$ 6.57	$ 17,194.13	
	Drywall systems (stl studs)	950	sf	$ 4.45	$ 4,226.61	
	Drywall ceiling, fire tape	1,915	sf	$ 1.96	$ 3,752.84	
	Drywall on walls	1,700	sf	$ 2.70	$ 4,592.07	
	Thermal and sound insulation	2,800	sf	$ 0.95	$ 2,669.44	
	Ceiling tile systems	1,915	sf	$ 4.03	$ 7,708.53	
	Tile, walls	280	sf	$ 36.74	$ 10,286.23	
	Resilient base	480	lf	$ 2.65	$ 1,271.16	
	Sealed concrete	1,915	sf	$ 0.57	$ 1,095.42	
	Painting	2,090	sf	$ 5.30	$ 11,069.69	
	FINISHES- TOTAL					$ 63,866.10
10	**SPECIALTIES**					
	Fire Extinguishers, wall mount	1	ea	$ 277.62	$ 277.62	
	Fire extinguisher cabinet & 10# ABC extinguisher	1	ea	$ 475.92	$ 475.92	
	First aid kit	1	ea	$ 127.12	$ 127.12	
	Signage	1	lsum	$ 600.00	$ 600.00	
	Corner guards	8	ea	$ 34.32	$ 274.57	
	Toilet & bath accessories					
	Grab bars	2	sets	$ 462.70	$ 925.40	
	Mirrors	2	ea	$ 171.61	$ 343.21	
	Towel dispensers	2	ea	$ 69.91	$ 139.83	
	T.P. dispensers	2	ea	$ 46.27	$ 92.54	
	Napkin	1	ea	$ 105.76	$ 105.76	
	Receptacles	2	ea	$ 330.50	$ 661.00	
	SS shelf	1	lsum	$ 635.58	$ 635.58	
	Attic access door (hatch)	1	lsum	$ 635.58	$ 635.58	
	SPECIALTIES - TOTAL					$ 5,294.14
14	**CONVEYING EQUIPMENT**					
	Inclined platform lift	1	lsum	$ 20,126.70	$ 20,126.70	
	CONVEYING EQUIPMENT - TOTAL					$ 20,126.70
21	**FIRE SUPPRESSION**					
	Fire sprinkler system	2,090	sf	$ 8.26	$ 17,268.71	
	FIRE SUPPRESSION - TOTAL					$ 17,268.71
22	**PLUMBING**					
	Underslab rough-in	1	lsum	$ 4,200.00	$ 4,200.00	
	Floor drain	3	ea	$ 650.00	$ 1,950.00	
	Above slab rough-in	1	lsum	$ 2,600.00	$ 2,600.00	
	Fixtures					
	Toilets	2	ea	$ 2,800.00	$ 5,600.00	
	Wall lavs	2	ea	$ 2,100.00	$ 4,200.00	
	Stainless steel sink	1	ea	$ 1,500.00	$ 1,500.00	
	Water cooler, dual w/bottle filler	1	ea	$ 3,397.68	$ 3,397.68	
	Janitor sink	1	ea	$ 1,494.98	$ 1,494.98	
	Water heater	1	ea	$ 2,600.00	$ 2,600.00	
	Gas piping	1	lsum	$ 3,500.00	$ 3,500.00	
	PLUMBING - TOTAL					$ 31,042.66
23	**HEATING VENTILATING AND AIR CONDITIONING**					
	HVAC system complete	2,090	sf	$ 60.54	$ 126,525.47	
	HVAC - TOTAL					$ 126,525.47
26	**ELECTRICAL**					
	Electrical system complete	2,090	sf	$ 38.00	$ 79,420.00	
	ELECTRICAL - TOTAL					$ 79,420.00

DIV	DESCRIPTION	QUAN	UNITS	UNIT COST	TOTALS	SUB-TOTAL
31	**EARTHWORK**					
	Demo existing underground shelter (approx. 20' x 30')	1	allow	$ 7,004.07	$ 7,004.07	
	Earthwork/grading, drain tile system	1	lsum	$ 9,533.70	$ 9,533.70	
	EARTHWORK - TOTAL					$ 16,537.77
32	**EXTERIOR IMPROVEMENTS**					
	Sodding	1	lsum	$ 1,767.15	$ 1,767.15	
	Plantings	1	lsum	$ 2,182.95	$ 2,182.95	
	EARTHWORK - TOTAL					$ 3,950.10
33	**UTILITIES**					
	Water Service, domestic	1	lsum	$ 9,043.65	$ 9,043.65	
	Fire service	1	lsum	$ 6,964.65	$ 6,964.65	
	UTILITIES - TOTAL					$ 16,008.30
	SUB-TOTAL ESTIMATED CONSTRUCTION COST					**Total**
						$ 754,573.17
	GENERAL CONDITIONS					**Total**
	Estimating/Design Contingency	5.0%				$ 37,728.66
	General Conditions/OH	10.0%				$ 75,457.32
	Building Permit					$ 7,000.00
	Liability Insurance					$ -
	Builder's Risk Insurance	0.60%				$ 5,248.55
	GC/CM Profit	6.0%				$ 52,800.46
	Payment and Performance Bonds	1.65%				$ 15,391.33
	TOTAL ESTIMATED CONSTRUCTION COST	**NCF PROTOTYPE 3**				**$ 948,199.50**
	COST PER SQUARE FOOT					*$453.68*

ALTERNATE

Omit shutters and standard glass windows and provide hurricane/tornado resistant glass windows

Aluminum windows, 40" x 64", fixed, increased cost	6	ea	$ 540.00	$ 3,240.00
Aluminum windows, 24" x 60", fixed, fixed, increased cost	1	ea	$ 300.00	$ 300.00
Shutters, UL windstorm	(7)	ea	$ 4,791.60	$ (33,541.20)
				$ (30,001.20)

DIV	DESCRIPTION	QUAN	UNITS	UNIT COST	TOTALS	SUB-TOTAL
08	**OPENINGS**					
	HM doors/frames, 3' x 7' (exterior) UL windstorm	2	ea	$ 4,318.43	$ 8,636.86	
	HM doors/frames, 3' x 7' (exterior)	1	ea	$ 1,963.94	$ 1,963.94	
	Wood door, HM frames, 3' x 7' (interior)	3	ea	$ 1,699.50	$ 5,098.50	
	Wood door, HM frames, 6' x 7' (interior)	1	ea	$ 2,369.00	$ 2,369.00	
	Aluminum windows, 40" x 64", fixed	6	ea	$ 1,634.00	$ 9,804.00	
	Aluminum windows, 24" x 60", fixed	1	ea	$ 1,243.83	$ 1,243.83	
	Shutters, UL windstorm	7	ea	$ 4,935.35	$ 34,547.44	
	OPENINGS - TOTAL					$ 63,663.57
09	**FINISHES**					
	Exterior wall framing (heavy stl studs, gyp sheathing)	2,618	sf	$ 6.76	$ 17,709.96	
	Drywall systems (stl studs)	950	sf	$ 4.58	$ 4,353.41	
	Drywall ceiling, fire tape	1,915	sf	$ 2.02	$ 3,865.42	
	Drywall on walls	1,700	sf	$ 2.78	$ 4,729.83	
	Thermal and sound insulation	2,800	sf	$ 0.98	$ 2,749.52	
	Ceiling tile systems	1,915	sf	$ 4.15	$ 7,939.78	
	Tile, walls	280	sf	$ 37.84	$ 10,594.81	
	Resilient base	480	lf	$ 2.73	$ 1,309.29	
	Sealed concrete	1,915	sf	$ 0.59	$ 1,128.28	
	Painting	2,090	sf	$ 5.46	$ 11,401.78	
	FINISHES- TOTAL					$ 65,782.08
10	**SPECIALTIES**					
	Fire Extinguishers, wall mount	1	ea	$ 285.95	$ 285.95	
	Fire extinguisher cabinet & 10# ABC extinguisher	1	ea	$ 490.20	$ 490.20	
	First aid kit	1	ea	$ 130.93	$ 130.93	
	Signage	1	lsum	$ 618.00	$ 618.00	
	Corner guards	8	ea	$ 35.35	$ 282.81	
	Toilet & bath accessories					
	Grab bars	2	sets	$ 476.58	$ 953.17	
	Mirrors	2	ea	$ 176.75	$ 353.51	
	Towel dispensers	2	ea	$ 72.01	$ 144.02	
	T.P. dispensers	2	ea	$ 47.66	$ 95.32	
	Napkin	1	ea	$ 108.93	$ 108.93	
	Receptacles	2	ea	$ 340.42	$ 680.83	
	SS shelf	1	lsum	$ 654.65	$ 654.65	
	Attic access door (hatch)	1	lsum	$ 654.65	$ 654.65	
	SPECIALTIES - TOTAL					$ 5,452.96
14	**CONVEYING EQUIPMENT**					
	Inclined platform lift	1	lsum	$ 20,931.77	$ 20,931.77	
	CONVEYING EQUIPMENT - TOTAL					$ 20,931.77
21	**FIRE SUPPRESSION**					
	Fire sprinkler system	2,090	sf	$ 8.59	$ 17,959.46	
	FIRE SUPPRESSION - TOTAL					$ 17,959.46
22	**PLUMBING**					
	Underslab rough-in	1	lsum	$ 4,368.00	$ 4,368.00	
	Floor drain	3	ea	$ 676.00	$ 2,028.00	
	Above slab rough-in	1	lsum	$ 2,704.00	$ 2,704.00	
	Fixtures					
	Toilets	2	ea	$ 2,912.00	$ 5,824.00	
	Wall lavs	2	ea	$ 2,184.00	$ 4,368.00	
	Stainless steel sink	1	ea	$ 1,560.00	$ 1,560.00	
	Water cooler, dual w/bottle filler	1	ea	$ 3,533.59	$ 3,533.59	
	Janitor sink	1	ea	$ 1,554.78	$ 1,554.78	
	Water heater	1	ea	$ 2,704.00	$ 2,704.00	
	Gas piping	1	lsum	$ 3,640.00	$ 3,640.00	
	PLUMBING - TOTAL					$ 32,284.37
23	**HEATING VENTILATING AND AIR CONDITIONING**					
	HVAC system complete	2,090	sf	$ 64.17	$ 134,116.99	
	HVAC - TOTAL					$ 134,116.99
26	**ELECTRICAL**					
	Electrical system complete	2,090	sf	$ 40.28	$ 84,185.20	
	ELECTRICAL - TOTAL					$ 84,185.20

DIV	DESCRIPTION	QUAN	UNITS	UNIT COST	TOTALS	SUB-TOTAL
31	**EARTHWORK**					
	Demo existing underground shelter (approx. 20' x 30')	1	allow	$ 7,214.19	$ 7,214.19	
	Earthwork/grading, drain tile system	1	lsum	$ 9,819.71	$ 9,819.71	
	EARTHWORK - TOTAL					$ 17,033.90
32	**EXTERIOR IMPROVEMENTS**					
	Sodding	1	lsum	$ 1,820.16	$ 1,820.16	
	Plantings	1	lsum	$ 2,248.44	$ 2,248.44	
	EARTHWORK - TOTAL					$ 4,068.60
33	**UTILITIES**					
	Water Service, domestic	1	lsum	$ 9,314.96	$ 9,314.96	
	Fire service	1	lsum	$ 7,173.59	$ 7,173.59	
	UTILITIES - TOTAL					$ 16,488.55

	SUB-TOTAL ESTIMATED CONSTRUCTION COST					Total
						$ 785,035.59

	GENERAL CONDITIONS					Total
	Estimating/Design Contingency	5.0%				$ 39,251.78
	General Conditions/OH	10.0%				$ 78,503.56
	Building Permit					$ 7,000.00
	Liability Insurance					$ -
	Builder's Risk Insurance	0.60%				$ 5,458.75
	GC/CM Profit	6.0%				$ 54,914.98
	Payment and Performance Bonds	1.65%				$ 16,007.72
	TOTAL ESTIMATED CONSTRUCTION COST	**NCF PROTOTYPE 3**				**$ 986,172.37**
	COST PER SQUARE FOOT					*$471.85*

ALTERNATE

Omit shutters and standard glass windows and provide hurricane/tornado resistant glass windows

Aluminum windows, 40" x 64", fixed, increased cost	6 ea	$ 540.00	$ 3,240.00	
Aluminum windows, 24" x 60", fixed, fixed, increased cost	1 ea	$ 300.00	$ 300.00	
Shutters, UL windstorm	(7) ea	$ 4,935.35	$ (34,547.44)	
			$ (31,007.44)	

PROTOTYPE #4– COMMUNITY ROOM WITH SHELTER ADJACENT

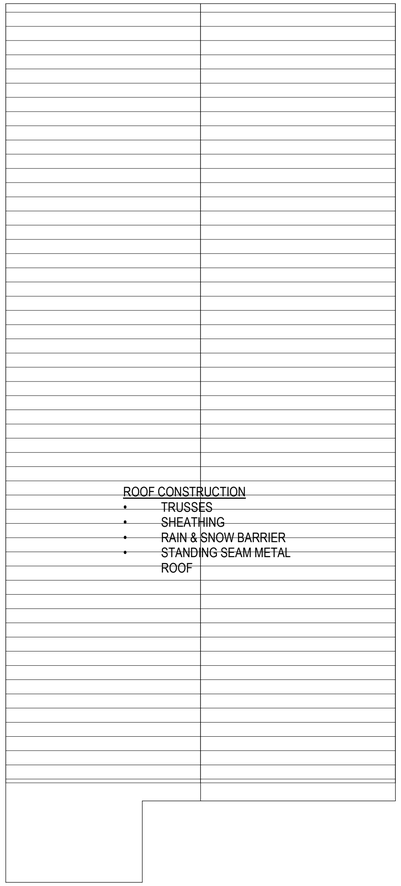
Overview

Prototype #4 looked to address some of the concerns that were identified with Protype #3. In this option, the storm shelter is designed as a standalone shelter with a more conventional construction adjacent for the community room. This alleviates the issues with accessibility and additional toilets but requires a hardened construction. The prototype looks to find efficiencies with some of the shared amenities, primarily toilets.

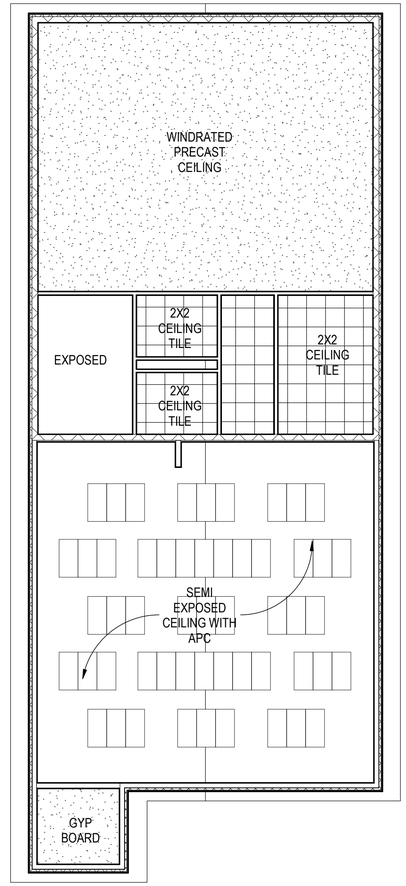
With this option, the overall footprint is bigger however, can be adaptable to various site conditions and also allows for a community to masterplan for future expansion (build the shelter first and then add the community room when funds are available)

PLANS - PROTOTYPE #4

COMMUNITY ROOM WITH STORM SHELTER ADJACENT



A **ROOF PLAN - PROTOYPE #6**
SCALE: 1/8" = 1'-0"



B **FIRST LEVEL CEILING PLAN - PROTOTYPE #6**
SCALE: 1/8" = 1'-0"

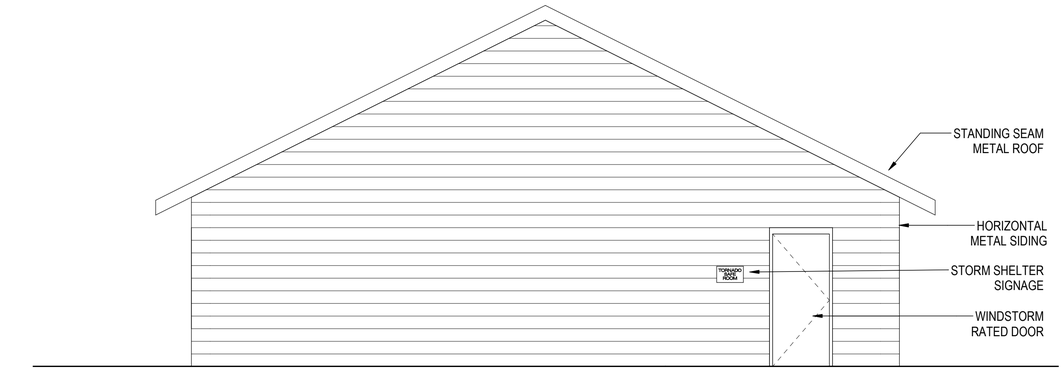
NORTHCOUNTRY FOUNDATION
SHELTER PROTOTYPE REDESIGN

TSP Architecture Engineering Planning

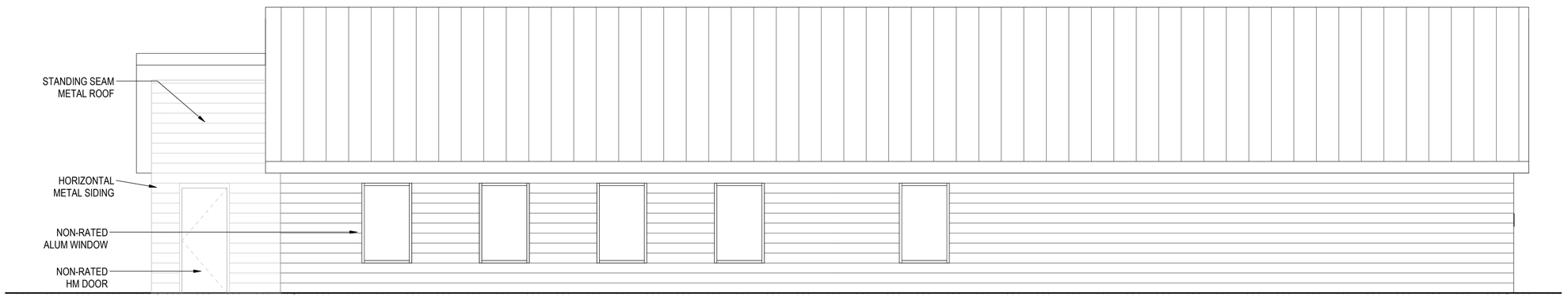
08/31/21

EXTERIOR ELEVATIONS - PROTOTYPE #4

COMMUNITY ROOM WITH STORM SHELTER ADJACENT



B **NORTH ELEVATION - PROTOTYPE #6**
SCALE: 1/4" = 1'-0"



A **EAST ELEVATION - PROTOTYPE #6**
SCALE: 1/4" = 1'-0"

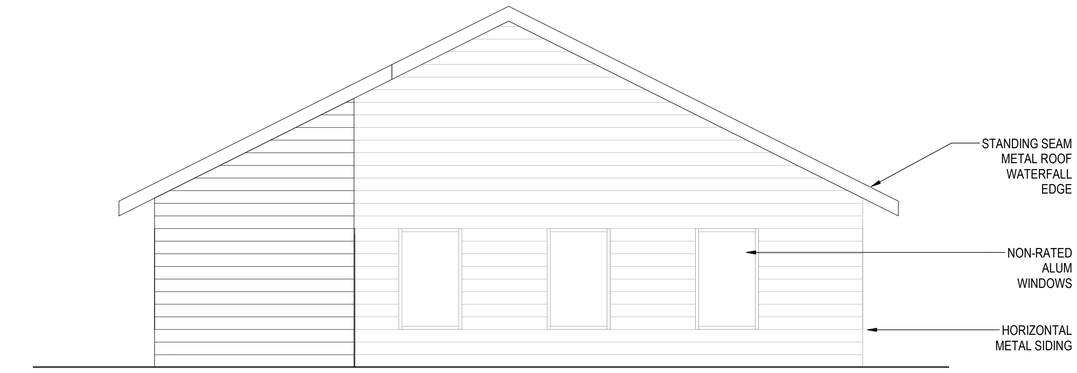
NORTHCOUNTRY FOUNDATION
SHELTER PROTOTYPE REDESIGN

TSP Architecture Engineering Planning

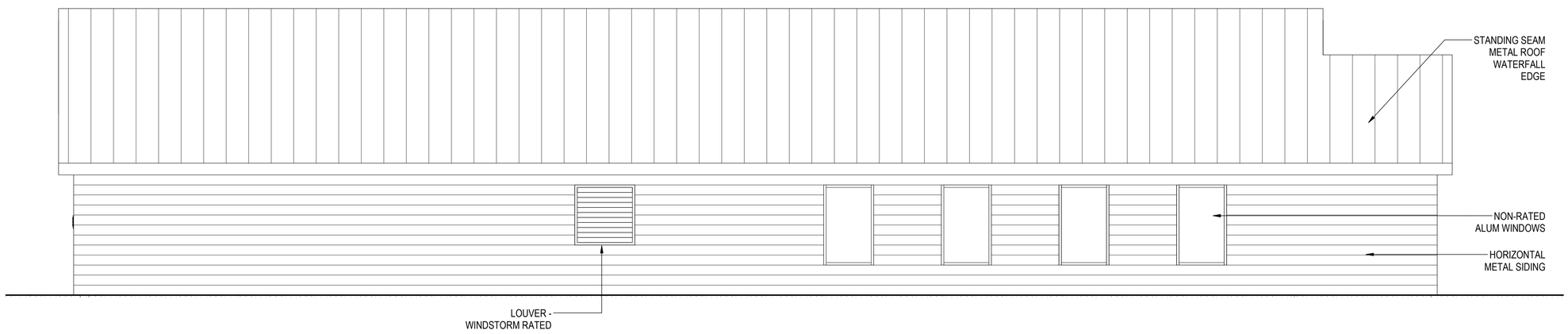
08/20/21

EXTERIOR ELEVATIONS - PROTOTYPE #4

COMMUNITY ROOM WITH STORM SHELTER ADJACENT



B **SOUTH ELEVATION - PROTOTYPE #6**
SCALE: 1/4" = 1'-0"



A **WEST ELEVATION - PROTOTYPE #6**
SCALE: 1/4" = 1'-0"

NORTHCOUNTRY FOUNDATION
SHELTER PROTOTYPE REDESIGN

TSP Architecture Engineering Planning

08/20/21

1500 Highway 52 N
Rochester, MN 55901
phone (507) 288-8155
teamtsp.com

2023 COST ESTIMATE

PROBABLE CONSTRUCTION COST DETAIL

DATE: 05/27/22

PROJ: NCF Storm Shelter Updates Prototype 4 - Community Room with Shelter Adjacent — **3,120 sf**

LOC: Various Locations, Minnesota — **PROJECT NO:** 01210892 — **ESTIMATOR:** SLL

The amounts stated herein are our best estimate of probable construction costs based on current information. Because costs are influenced by market conditions, changes in project scope, and other factors beyond our control, we cannot guarantee that actual construction costs will equal this estimate.

DIV	DESCRIPTION	QUAN	UNITS	UNIT COST	TOTALS	SUB-TOTAL
01	**GENERAL REQUIREMENTS**					
	Misc. materials	3,120	sf	$ 3.56	$ 11,104.85	
	Rentals	1	lsum	$ 2,444.90	$ 2,444.90	
	Mobilize	1	lsum	$ 965.51	$ 965.51	
	Temp fencing	1	lsum	$ 4,431.39	$ 4,431.39	
	Small tools	1	lsum	$ 2,772.00	$ 2,772.00	
	Clean up	3,120	sf	$ 1.40	$ 4,362.62	
	Job supervision	3,120	sf	$ 18.88	$ 58,895.39	
	GC labor	3,120	sf	$ 0.69	$ 2,141.65	
	GC carpentry	3,120	sf	$ 1.07	$ 3,331.46	
	Dumpster/disposal	3,120	sf	$ 1.78	$ 5,568.80	
	Site survey	1	lsum	$ 2,182.95	$ 2,182.95	
	GENERAL REQUIREMENTS - TOTAL					$ 98,201.51
03	**CONCRETE**					
	Continuous strip footings	41	cy	$ 460.00	$ 18,860.00	
	Poured foundation walls	50	cy	$ 490.00	$ 24,500.00	
	S.O.G. Floors, 4"	2,896	sf	$ 7.37	$ 21,351.42	
	Topping - 4"	1,637	sf	$ 7.12	$ 11,652.98	
	Stoop cap	73	sf	$ 8.26	$ 603.17	
	Void form	65	sf	$ 4.93	$ 320.59	
	Precast					
	Hollow core roof deck - 12"	1,637	sf	$ 22.50	$ 36,832.50	
	CONCRETE - TOTAL					$ 114,120.65
04	**MASONRY**					
	Concrete masonry units					
	8" CMU	1,680	sf	$ 28.69	$ 48,199.54	
	MASONRY - TOTAL					$ 48,199.54
05	**METALS**					
	Misc. Metals	3,120	sf	$ 1.25	$ 3,907.33	
	METALS - TOTAL					$ 3,907.33
06	**WOOD, PLASTICS AND COMPOSITES**					
	Rough carpentry	3,120	sf	$ 3.60	$ 11,237.05	
	Wood stud framed wall	1,300	sf	$ 4.60	$ 5,980.00	
	Wood roof truss system and soffit framing	3,765	sf	$ 7.03	$ 26,482.08	
	Privacy screen	1	lsum	$ 1,059.30	$ 1,059.30	
	Roof sheathing	3,882	sf	$ 4.14	$ 16,064.49	
	Finish carpentry	3,120	sf	$ 2.40	$ 7,474.90	
	Plastic laminate casework	15	lf	$ 524.03	$ 7,598.39	
	Solid surface tops	15	lf	$ 165.96	$ 2,489.45	
	WOOD, PLASTICS AND COMPOSITES - TOTAL					$ 78,385.66
07	**THERMAL AND MOISTURE PROTECTION**					
	2" rigid below grade insulation	1,024	sf	$ 2.91	$ 2,978.22	
	Moisture barrier	2,665	sf	$ 3.69	$ 9,824.16	
	Rigid insulation	2,665	sf	$ 3.48	$ 9,286.99	
	Attic insulation	3,120	sf	$ 1.96	$ 6,115.82	
	Metal roof and flashing, standing seam	3,882	sf	$ 28.31	$ 109,914.95	
	Metal siding over furring strips	2,665	sf	$ 12.00	$ 31,980.00	
	Soffits	540	sf	$ 17.42	$ 9,408.96	
	Roof vents	1	lsum	$ 653.40	$ 653.40	
	Gutter & downspout	102	lf	$ 13.07	$ 1,332.94	
	Sealants	3,120	sf	$ 13.07	$ 40,772.16	
	THERMAL AND MOISTURE PROTECTION - TOTAL					$ 222,267.60

DIV	DESCRIPTION	QUAN	UNITS	UNIT COST	TOTALS	SUB-TOTAL
08	**OPENINGS**					
	HM doors/frames, 3' x 7' (exterior) UL windstorm	2	ea	$ 4,192.65	$ 8,385.30	
	HM doors/frames, 3' x 7' (interior)	1	ea	$ 1,700.00	$ 1,700.00	
	Wood door, HM frames, 3' x 7' (interior)	6	ea	$ 1,650.00	$ 9,900.00	
	Wood door, HM frames, 6' x 7' (interior)	1	ea	$ 2,300.00	$ 2,300.00	
	Aluminum windows, 40" x 64", fixed	11	ea	$ 1,586.41	$ 17,450.48	
	Aluminum windows, 24" x 60", fixed	1	ea	$ 1,207.60	$ 1,207.60	
	Shutters, UL windstorm	1	ea	$ 4,791.60	$ 4,791.60	
	Louver, UL windstorm	1	ea	$ 4,791.60	$ 4,791.60	
	OPENINGS - TOTAL					$ 50,526.59
09	**FINISHES**					
	Drywall systems (stl studs)	1,100	sf	$ 4.45	$ 4,893.97	
	Drywall ceiling, fire tape	1,350	sf	$ 1.96	$ 2,645.60	
	Drywall on walls	3,300	sf	$ 2.70	$ 8,914.01	
	Thermal and sound insulation	2,300	sf	$ 0.95	$ 2,192.75	
	Armstrong "Invisacoustics" ceiling panels	424	sf	$ 22.95	$ 9,730.80	
	Ceiling tile systems	350	sf	$ 4.03	$ 1,408.87	
	Tile, walls	280	sf	$ 36.74	$ 10,286.23	
	Resilient base	440	lf	$ 2.65	$ 1,165.23	
	Sealed concrete	2,896	sf	$ 0.57	$ 1,656.58	
	Painting	3,120	sf	$ 5.30	$ 16,525.08	
	FINISHES- TOTAL					$ 59,419.11
10	**SPECIALTIES**					
	Fire Extinguishers, wall mount	1	ea	$ 277.62	$ 277.62	
	Fire extinguisher cabinet & 10# ABC extinguisher	1	ea	$ 475.92	$ 475.92	
	First aid kit	1	ea	$ 127.12	$ 127.12	
	Signage	1	lsum	$ 600.00	$ 600.00	
	Corner guards	8	ea	$ 34.32	$ 274.57	
	Toilet & bath accessories					
	Grab bars	2	sets	$ 462.70	$ 925.40	
	Mirrors	2	ea	$ 171.61	$ 343.21	
	Towel dispensers	2	ea	$ 69.91	$ 139.83	
	T.P. dispensers	2	ea	$ 46.27	$ 92.54	
	Napkin	1	ea	$ 105.76	$ 105.76	
	Receptacles	2	ea	$ 330.50	$ 661.00	
	SS shelf	1	lsum	$ 635.58	$ 635.58	
	SPECIALTIES - TOTAL					$ 4,658.56
21	**FIRE SUPPRESSION**					
	Fire sprinkler system	3,120	sf	$ 8.26	$ 25,779.12	
	FIRE SUPPRESSION - TOTAL					$ 25,779.12
22	**PLUMBING**					
	Underslab rough-in	1	lsum	$ 4,200.00	$ 4,200.00	
	Floor drain	3	ea	$ 650.00	$ 1,950.00	
	Above slab rough-in	1	lsum	$ 2,600.00	$ 2,600.00	
	Fixtures					
	Toilets	2	ea	$ 2,800.00	$ 5,600.00	
	Wall lavs	2	ea	$ 2,100.00	$ 4,200.00	
	Stainless steel sink	1	ea	$ 1,500.00	$ 1,500.00	
	Water cooler, dual w/bottle filler	1	ea	$ 3,397.68	$ 3,397.68	
	Janitor sink	1	ea	$ 1,494.98	$ 1,494.98	
	Water heater	1	ea	$ 2,600.00	$ 2,600.00	
	Gas piping	1	lsum	$ 3,500.00	$ 3,500.00	
	PLUMBING - TOTAL					$ 31,042.66
23	**HEATING VENTILATING AND AIR CONDITIONING**					
	HVAC system complete	3,120	sf	$ 60.54	$ 188,880.12	
	HVAC - TOTAL					$ 188,880.12
26	**ELECTRICAL**					
	Electrical system complete	3,120	sf	$ 38.00	$ 118,560.00	
	ELECTRICAL - TOTAL					$ 118,560.00
31	**EARTHWORK**					
	Demo existing underground shelter (approx. 20' x 30')	1	allow	$ 7,004.07	$ 7,004.07	
	Earthwork/grading, drain tile system	1	lsum	$ 15,889.50	$ 15,889.50	
	EARTHWORK - TOTAL					$ 22,893.57

DIV	DESCRIPTION	QUAN	UNITS	UNIT COST	TOTALS	SUB-TOTAL
32	**EXTERIOR IMPROVEMENTS**					
	Sodding	1	lsum	$ 2,079.00	$ 2,079.00	
	Plantings	1	lsum	$ 2,182.95	$ 2,182.95	
	EARTHWORK - TOTAL					$ 4,261.95
33	**UTILITIES**					
	Water Service, domestic	1	lsum	$ 9,043.65	$ 9,043.65	
	Fire service	1	lsum	$ 6,964.65	$ 6,964.65	
	UTILITIES - TOTAL					$ 16,008.30
	SUB-TOTAL ESTIMATED CONSTRUCTION COST					**Total**
						$ 1,087,112.27
	GENERAL CONDITIONS					**Total**
	Estimating/Design Contingency	5.0%				$ 54,355.61
	General Conditions/OH	10.0%				$ 108,711.23
	Building Permit					$ 8,500.00
	Liability Insurance					$ -
	Builder's Risk Insurance	0.60%				$ 7,552.07
	GC/CM Profit	6.0%				$ 75,973.87
	Payment and Performance Bonds	1.65%				$ 22,146.38
	TOTAL ESTIMATED CONSTRUCTION COST	**NCF PROTOTYPE 4**				**$ 1,364,351.44**
	COST PER SQUARE FOOT					*$437.29*

ALTERNATE

Omit shutters and standard glass windows and provide hurricane/tornado resistant glass windows

Aluminum windows, 24" x 60", fixed, fixed, increased cost	1	ea	$ 300.00	$ 300.00	
Shutters, UL windstorm	(1)	ea	$ 4,791.60	$ (4,791.60)	
				$ (4,491.60)	

DIV	DESCRIPTION	QUAN	UNITS	UNIT COST	TOTALS	SUB-TOTAL
08	**OPENINGS**					
	HM doors/frames, 3' x 7' (exterior) UL windstorm	2	ea	$ 4,318.43	$ 8,636.86	
	HM doors/frames, 3' x 7' (interior)	1	ea	$ 1,751.00	$ 1,751.00	
	Wood door, HM frames, 3' x 7' (interior)	6	ea	$ 1,699.50	$ 10,197.00	
	Wood door, HM frames, 6' x 7' (interior)	1	ea	$ 2,369.00	$ 2,369.00	
	Aluminum windows, 40" x 64", fixed	11	ea	$ 1,634.00	$ 17,974.00	
	Aluminum windows, 24" x 60", fixed	1	ea	$ 1,243.83	$ 1,243.83	
	Shutters, UL windstorm	1	ea	$ 4,935.35	$ 4,935.35	
	Louver, UL windstorm	1	ea	$ 4,935.35	$ 4,935.35	
	OPENINGS - TOTAL					$ 52,042.38
09	**FINISHES**					
	Drywall systems (stl studs)	1,100	sf	$ 4.58	$ 5,040.78	
	Drywall ceiling, fire tape	1,350	sf	$ 2.02	$ 2,724.97	
	Drywall on walls	3,300	sf	$ 2.78	$ 9,181.43	
	Thermal and sound insulation	2,300	sf	$ 0.98	$ 2,258.53	
	Armstrong "Invisacoustics" ceiling panels	424	sf	$ 23.64	$ 10,022.72	
	Ceiling tile systems	350	sf	$ 4.15	$ 1,451.14	
	Tile, walls	280	sf	$ 37.84	$ 10,594.81	
	Resilient base	440	lf	$ 2.73	$ 1,200.19	
	Sealed concrete	2,896	sf	$ 0.59	$ 1,706.27	
	Painting	3,120	sf	$ 5.46	$ 17,020.83	
	FINISHES- TOTAL					$ 61,201.68
10	**SPECIALTIES**					
	Fire Extinguishers, wall mount	1	ea	$ 285.95	$ 285.95	
	Fire extinguisher cabinet & 10# ABC extinguisher	1	ea	$ 490.20	$ 490.20	
	First aid kit	1	ea	$ 130.93	$ 130.93	
	Signage	1	lsum	$ 618.00	$ 618.00	
	Corner guards	8	ea	$ 35.35	$ 282.81	
	Toilet & bath accessories					
	Grab bars	2	sets	$ 476.58	$ 953.17	
	Mirrors	2	ea	$ 176.75	$ 353.51	
	Towel dispensers	2	ea	$ 72.01	$ 144.02	
	T.P. dispensers	2	ea	$ 47.66	$ 95.32	
	Napkin	1	ea	$ 108.93	$ 108.93	
	Receptacles	2	ea	$ 340.42	$ 680.83	
	SS shelf	1	lsum	$ 654.65	$ 654.65	
	SPECIALTIES - TOTAL					$ 4,798.32
21	**FIRE SUPPRESSION**					
	Fire sprinkler system	3,120	sf	$ 8.59	$ 26,810.29	
	FIRE SUPPRESSION - TOTAL					$ 26,810.29
22	**PLUMBING**					
	Underslab rough-in	1	lsum	$ 3,533.59	$ 3,533.59	
	Floor drain	3	ea	$ 424.03	$ 1,272.09	
	Above slab rough-in	1	lsum	$ 2,120.15	$ 2,120.15	
	Fixtures					
	Toilets	2	ea	$ 2,261.50	$ 4,522.99	
	Wall lavs	2	ea	$ 1,201.42	$ 2,402.84	
	Stainless steel sink	1	ea	$ 989.40	$ 989.40	
	Water cooler, dual w/bottle filler	1	ea	$ 3,533.59	$ 3,533.59	
	Janitor sink	1	ea	$ 1,554.78	$ 1,554.78	
	Water heater	1	ea	$ 2,120.15	$ 2,120.15	
	Gas piping	1	lsum	$ 2,826.87	$ 2,826.87	
	PLUMBING - TOTAL					$ 24,876.45
23	**HEATING VENTILATING AND AIR CONDITIONING**					
	HVAC system complete	3,120	sf	$ 64.17	$ 200,212.93	
	HVAC - TOTAL					$ 200,212.93
26	**ELECTRICAL**					
	Electrical system complete	3,120	sf	$ 40.28	$ 125,673.60	
	ELECTRICAL - TOTAL					$ 125,673.60
31	**EARTHWORK**					
	Demo existing underground shelter (approx. 20' x 30')	1	allow	$ 7,214.19	$ 7,214.19	
	Earthwork/grading, drain tile system	1	lsum	$ 16,366.19	$ 16,366.19	
	EARTHWORK - TOTAL					$ 23,580.38

DIV	DESCRIPTION	QUAN	UNITS	UNIT COST	TOTALS	SUB-TOTAL
32	**EXTERIOR IMPROVEMENTS**					
	Sodding	1	lsum	$ 2,141.37	$ 2,141.37	
	Plantings	1	lsum	$ 2,248.44	$ 2,248.44	
	EARTHWORK - TOTAL					$ 4,389.81
33	**UTILITIES**					
	Water Service, domestic	1	lsum	$ 9,314.96	$ 9,314.96	
	Fire service	1	lsum	$ 7,173.59	$ 7,173.59	
	UTILITIES - TOTAL					$ 16,488.55
	SUB-TOTAL ESTIMATED CONSTRUCTION COST					**Total**
						$ 1,124,594.35
	GENERAL CONDITIONS					**Total**
	Estimating/Design Contingency	5.0%				$ 56,229.72
	General Conditions/OH	10.0%				$ 112,459.44
	Building Permit					$ 8,500.00
	Liability Insurance					$ -
	Builder's Risk Insurance	0.60%				$ 7,810.70
	GC/CM Profit	6.0%				$ 78,575.65
	Payment and Performance Bonds	1.65%				$ 22,904.80
	TOTAL ESTIMATED CONSTRUCTION COST	**NCF PROTOTYPE 4**				**$ 1,411,074.66**
	COST PER SQUARE FOOT					*$452.27*

ALTERNATE

Omit shutters and standard glass windows and provide hurricane/tornado resistant glass windows

Aluminum windows, 24" x 60", fixed, fixed, increased cost	1 ea	$ 300.00	$ 300.00	
Shutters, UL windstorm	(1) ea	$ 4,935.35	$ (4,935.35)	
			$ (4,635.35)	

PROTOTYPE #5 – MONOLITHIC DOME

Overview

The final prototype we analyzed takes a completely unique approach on achieving the goals stated. A monolithic dome provides inherent protective properties against storms that provides efficiencies. They are also typically most cost effective on a per square foot basis as compared to a brick-and-mortar construction.

The shelter is a dual-use facility programmed for use as a community room space along with providing protection against tornadoes in the case of emergency. This provides efficiencies in space but may result in higher costs as compared to a standalone shelter (no community function) because of size and level of finish.

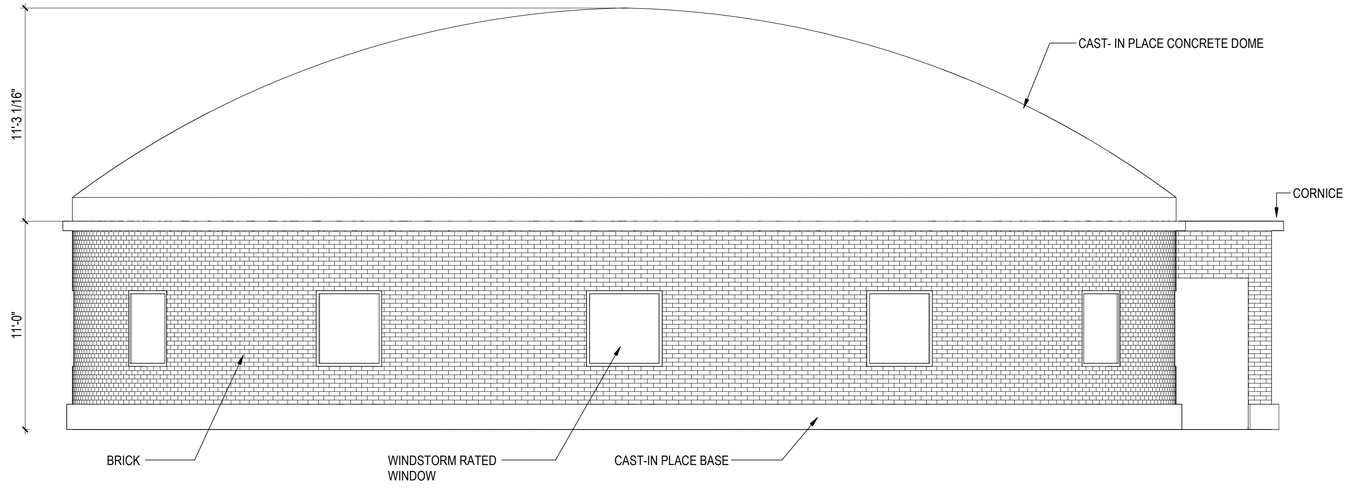
A monolithic dome is a composite concrete and steel rebar construction for the entirety of the assembly. The assembly goes from roof down to top of foundation. With some minor adjustments to the engineering, it can become FEMA rated.

The inside of the dome is a free-standing structure, meaning, there is no columns or other structure which allows for more flexibility and adaptability of the interior walls. Also, due to the amount of concrete used, a monolithic dome also is an energy efficient construction as all that mass holds and dissipates heat effectively.

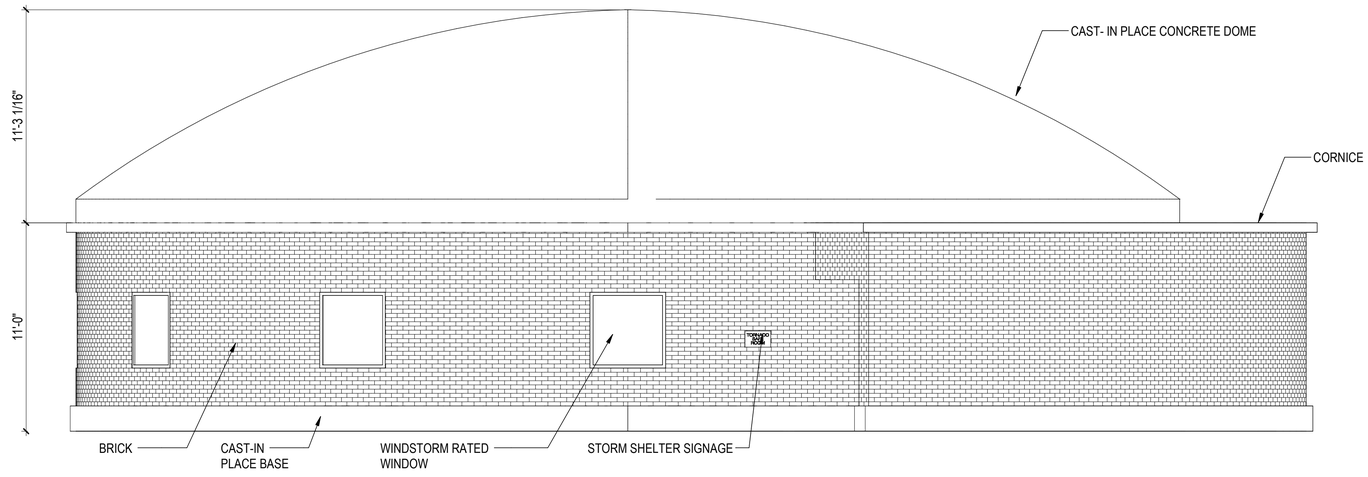
The building form is unique and with the prototype presented, a stem wall is shown that allows for windows to be provided, but that would need additional protection to achieve storm shelter status. Due to the nature of the building form, you will find that some rooms can get odd shaped, but when designed correctly, can still be functional.

EXTERIOR ELEVATIONS - PROTOTYPE #5

MONOLITHIC DOME



B **EAST ELEVATION - PROTOTYPE #5**
SCALE: 1/4" = 1'-0"



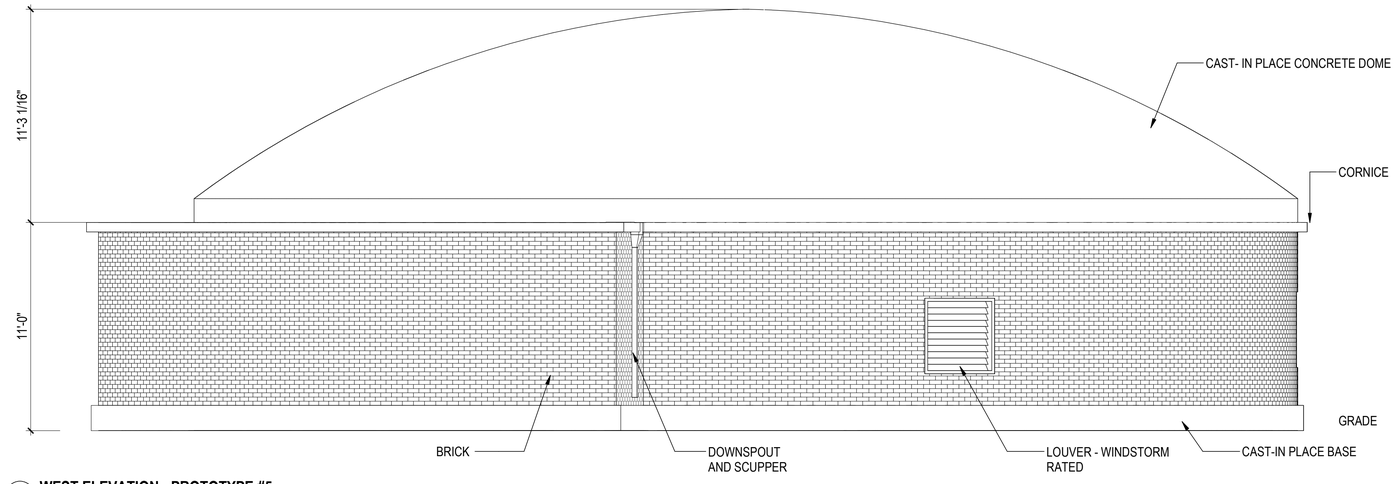
A **NORTH ELEVATION - PROTOTYPE #5**
SCALE: 1/4" = 1'-0"

NORTHCOUNTRY FOUNDATION
SHELTER PROTOTYPE REDESIGN

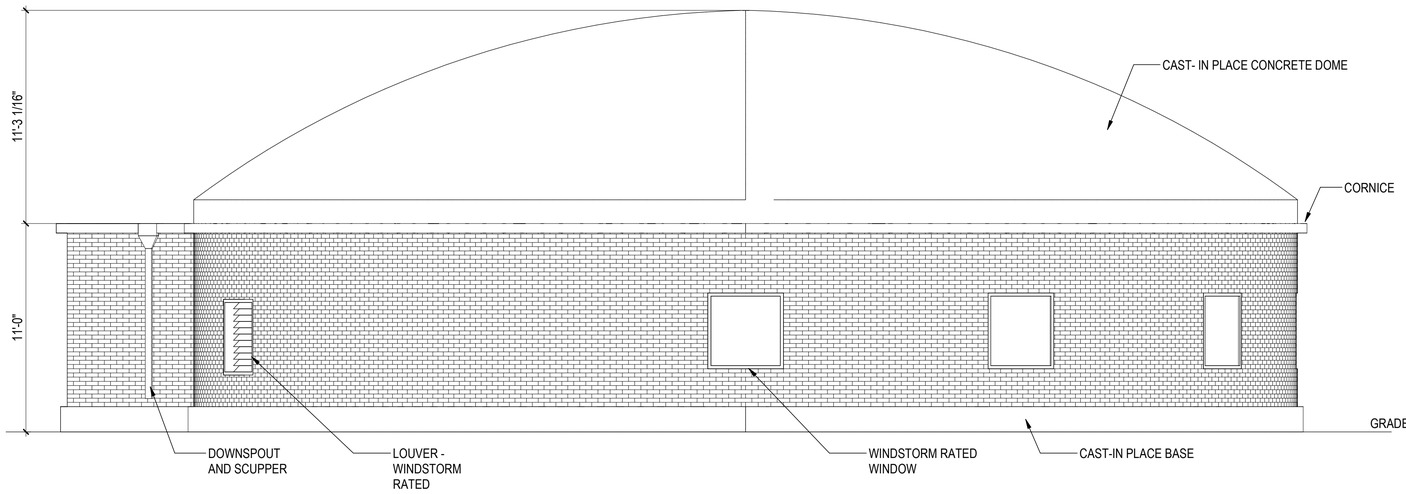
TSP Architecture Engineering Planning

EXTERIOR ELEVATIONS - PROTOTYPES #5

MONOLITHIC DOME



B **WEST ELEVATION - PROTOTYPE #5**
SCALE: 1/4" = 1'-0"



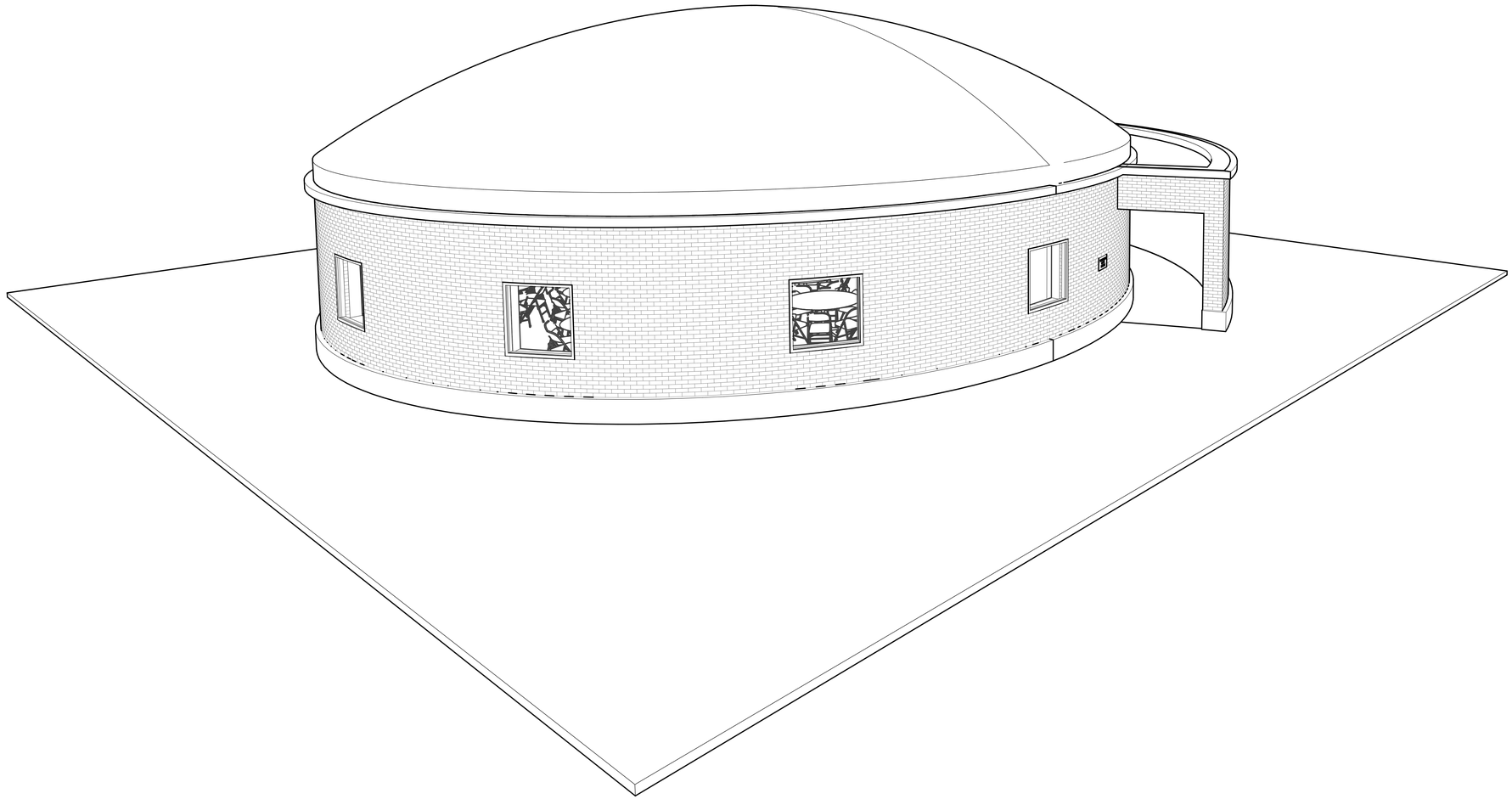
A **SOUTH ELEVATION - PROTOTYPE #5**
SCALE: 1/4" = 1'-0"

NORTHCOUNTRY FOUNDATION
SHELTER PROTOTYPE REDESIGN

TSP Architecture Engineering Planning

3D PERSPECTIVE - PROTOTYPE #5

MONOLITHIC DOME



NORTHCOUNTRY FOUNDATION
SHELTER PROTOTYPE REDESIGN

TSP Architecture Engineering Planning

03/02/22

DIV	DESCRIPTION	QUAN	UNITS	UNIT COST	TOTALS	SUB-TOTAL
08	**OPENINGS**					
	HM doors/frames, 3' x 7' (exterior) UL windstorm	1	ea	$ 4,192.65	$ 4,192.65	
	Wood door, HM frames, 3' x 7' (interior)	3	ea	$ 1,650.00	$ 4,950.00	
	Wood door, HM frames, 6' x 7' (interior)	2	ea	$ 2,300.00	$ 4,600.00	
	Aluminum windows, 48" x 48", fixed	8	ea	$ 1,420.00	$ 11,360.00	
	Shutters, UL windstorm	7	ea	$ 4,791.60	$ 33,541.20	
	OPENINGS - TOTAL					$ 58,643.85
09	**FINISHES**					
	Drywall systems (stl studs, hang & tape 2-sides)	2,044	sf	$ 12.85	$ 26,265.40	
	Drywall systems (stl studs, hang & tape 1-side)	264	sf	$ 9.75	$ 2,574.00	
	Armstrong "Invisacoustics" ceiling panels	568	sf	$ 22.95	$ 13,035.60	
	Ceiling tile systems	277	sf	$ 4.58	$ 1,267.60	
	Tile, walls	280	sf	$ 36.74	$ 10,286.23	
	Resilient base	600	lf	$ 2.65	$ 1,588.95	
	Sealed concrete	2,478	sf	$ 0.57	$ 1,417.47	
	Painting	2,968	sf	$ 4.14	$ 12,299.34	
	FINISHES- TOTAL					$ 68,734.59
10	**SPECIALTIES**					
	Fire Extinguishers, wall mount	1	ea	$ 277.62	$ 277.62	
	Fire extinguisher cabinet & 10# ABC extinguisher	1	ea	$ 475.92	$ 475.92	
	First aid kit	1	ea	$ 127.12	$ 127.12	
	Signage	1	lsum	$ 600.00	$ 600.00	
	Corner guards	4	ea	$ 34.32	$ 137.29	
	Toilet & bath accessories					
	Grab bars	2	sets	$ 462.70	$ 925.40	
	Mirrors	2	ea	$ 171.61	$ 343.21	
	Towel dispensers	2	ea	$ 69.91	$ 139.83	
	T.P. dispensers	2	ea	$ 46.27	$ 92.54	
	Napkin	1	ea	$ 105.76	$ 105.76	
	Receptacles	2	ea	$ 330.50	$ 661.00	
	SS shelf	1	lsum	$ 635.58	$ 635.58	
	SPECIALTIES - TOTAL					$ 4,521.27
21	**FIRE SUPPRESSION**					
	Fire sprinkler system	2,720	sf	$ 8.26	$ 22,474.11	
	FIRE SUPPRESSION - TOTAL					$ 22,474.11
22	**PLUMBING**					
	Underslab rough-in	1	lsum	$ 4,200.00	$ 4,200.00	
	Floor drain	3	ea	$ 650.00	$ 1,950.00	
	Above slab rough-in	1	lsum	$ 2,600.00	$ 2,600.00	
	Fixtures					
	Toilets	2	ea	$ 2,800.00	$ 5,600.00	
	Wall lavs	2	ea	$ 2,100.00	$ 4,200.00	
	Stainless steel sink	1	ea	$ 1,500.00	$ 1,500.00	
	Water cooler, dual w/bottle filler	1	ea	$ 3,397.68	$ 3,397.68	
	Janitor sink	1	ea	$ 1,494.98	$ 1,494.98	
	Water heater	1	ea	$ 2,600.00	$ 2,600.00	
	Gas piping	1	lsum	$ 3,500.00	$ 3,500.00	
	PLUMBING - TOTAL					$ 31,042.66
23	**HEATING VENTILATING AND AIR CONDITIONING**					
	HVAC system complete	2,720	sf	$ 52.00	$ 141,440.00	
	HVAC - TOTAL					$ 141,440.00
26	**ELECTRICAL**					
	Electrical system complete	2,968	sf	$ 38.00	$ 112,784.00	
	ELECTRICAL - TOTAL					$ 112,784.00

DIV	DESCRIPTION	QUAN	UNITS	UNIT COST	TOTALS	SUB-TOTAL
31	**EARTHWORK**					
	Demo existing underground shelter (approx. 20' x 30')	1	allow	$ 7,004.07	$ 7,004.07	
	Earthwork/grading, drain tile system	1	lsum	$ 15,800.00	$ 15,800.00	
	EARTHWORK - TOTAL					$ 22,804.07
32	**EXTERIOR IMPROVEMENTS**					
	Sodding	1	lsum	$ 3,118.50	$ 3,118.50	
	Plantings	1	lsum	$ 2,095.63	$ 2,095.63	
	EARTHWORK - TOTAL					$ 5,214.13
33	**UTILITIES**					
	Water Service, domestic	1	lsum	$ 9,043.65	$ 9,043.65	
	Fire service	1	lsum	$ 6,964.65	$ 6,964.65	
	UTILITIES - TOTAL					$ 16,008.30

	SUB-TOTAL ESTIMATED CONSTRUCTION COST					Total
						$ 988,251.26

	GENERAL CONDITIONS					Total
	Estimating/Design Contingency	5.0%				$ 49,412.56
	General Conditions/OH	10.0%				$ 98,825.13
	Building Permit					$ 8,000.00
	Liability Insurance					$ -
	Builder's Risk Insurance	0.60%				$ 6,866.93
	GC/CM Profit	6.0%				$ 69,081.35
	Payment and Performance Bonds	1.65%				$ 20,137.21

	TOTAL ESTIMATED CONSTRUCTION COST	NCF PROTOTYPE 5 (Dome)			**$ 1,240,574.45**
	COST PER SQUARE FOOT				*$417.98*

ALTERNATE

Omit shutters and standard glass windows and provide hurricane/tornado resistant glass windows

Aluminum windows, 48" x 48", fixed, increased cost	8	ea	$ 540.00	$ 4,320.00	
Shutters, UL windstorm	(7)	ea	$ 4,791.60	$ (33,541.20)	
				$ (29,221.20)	

1500 Highway 52 N
Rochester, MN 55901
phone (507) 288-8155
teamtsp.com

2024 COST ESTIMATE

PROBABLE CONSTRUCTION COST DETAIL

DATE: 05/27/22

PROJ: NCF Storm Shelter Updates Prototype 5 - Dome — **2,968 sf**

LOC: Various Locations, Minnesota — **PROJECT NO:** 01210892 — **ESTIMATOR:** SLL

The amounts stated herein are our best estimate of probable construction costs based on current information. Because costs are influenced by market conditions, changes in project scope, and other factors beyond our control, we cannot guarantee that actual construction costs will equal this estimate.

DIV	DESCRIPTION	QUAN	UNITS	UNIT COST	TOTALS	SUB-TOTAL
01	**GENERAL REQUIREMENTS**					
	Misc. materials	2,968	sf	$ 3.67	$ 10,880.76	
	Rentals	1	lsum	$ 2,518.25	$ 2,518.25	
	Mobilize	1	lsum	$ 994.47	$ 994.47	
	Temp fencing	1	lsum	$ 4,564.33	$ 4,564.33	
	Small tools	1	lsum	$ 2,855.16	$ 2,855.16	
	Clean up	2,968	sf	$ 1.44	$ 4,274.59	
	Job supervision	2,968	sf	$ 19.44	$ 57,706.91	
	GC labor	2,968	sf	$ 0.71	$ 2,098.43	
	GC carpentry	2,968	sf	$ 1.10	$ 3,264.23	
	Dumpster/disposal	2,968	sf	$ 1.84	$ 5,456.42	
	Site survey	1	lsum	$ 2,248.44	$ 2,248.44	
	GENERAL REQUIREMENTS - TOTAL					$ 96,861.99
03	**CONCRETE**					
	Continuous strip footings	36	cy	$ 478.40	$ 17,222.40	
	Poured foundation walls (vestibule)	12	cy	$ 509.60	$ 6,115.20	
	Poured foundation/upper walls	118	cy	$ 509.60	$ 60,132.80	
	Add for integral insulation system	740	sf	$ 7.07	$ 5,233.28	
	Cast-in-place dome structure	2,720	sf	$ 67.60	$ 183,872.00	
	S.O.G. Floors, 4"	2,678	sf	$ 7.67	$ 20,533.93	
	Topping - 4"	232	sf	$ 7.40	$ 1,717.55	
	Precast					
	Hollow core roof deck - 12"	232	sf	$ 29.12	$ 6,755.84	
	CONCRETE - TOTAL					$ 301,583.00
04	**MASONRY**					
	Brick veneer	2,160	sf	$ 34.37	$ 74,243.88	
	2 1/2" rigid insulation	2,300	sf	$ 4.26	$ 9,802.94	
	MASONRY - TOTAL					$ 84,046.82
05	**METALS**					
	Misc. Metals	2,968	sf	$ 0.37	$ 1,090.74	
	METALS - TOTAL					$ 1,090.74
06	**WOOD, PLASTICS AND COMPOSITES**					
	Rough carpentry	1	lsum	$ 2,600.00	$ 2,600.00	
	Finish carpentry	2,478	sf	$ 2.42	$ 6,005.88	
	Plastic laminate casework	13	lf	$ 530.12	$ 6,891.62	
	Solid surface tops	13	lf	$ 167.89	$ 2,182.63	
	WOOD, PLASTICS AND COMPOSITES - TOTAL					$ 17,680.13
07	**THERMAL AND MOISTURE PROTECTION**					
	Membrane roofing w/insulation	250	sf	$ 19.53	$ 4,882.32	
	Roof vents		sf	$ 1.96	$ -	
	Scupper & downspout	2	ea	$ 408.50	$ 817.00	
	Flashing & sheet metal	235	lf	$ 25.87	$ 6,079.84	
	Sealants	2,968	sf	$ 2.88	$ 8,559.71	
	Louver	1	ea	$ 2,019.01	$ 2,019.01	
	THERMAL AND MOISTURE PROTECTION - TOTAL					$ 22,357.88

DIV	DESCRIPTION	QUAN	UNITS	UNIT COST	TOTALS	SUB-TOTAL
31	**EARTHWORK**					
	Demo existing underground shelter (approx. 20' x 30')	1	allow	$ 7,214.19	$ 7,214.19	
	Earthwork/grading, drain tile system	1	lsum	$ 16,274.00	$ 16,274.00	
	EARTHWORK - TOTAL					$ 23,488.19
32	**EXTERIOR IMPROVEMENTS**					
	Sodding	1	lsum	$ 3,212.06	$ 3,212.06	
	Plantings	1	lsum	$ 2,158.50	$ 2,158.50	
	EARTHWORK - TOTAL					$ 5,370.56
33	**UTILITIES**					
	Water Service, domestic	1	lsum	$ 9,314.96	$ 9,314.96	
	Fire service	1	lsum	$ 7,173.59	$ 7,173.59	
	UTILITIES - TOTAL					$ 16,488.55

	SUB-TOTAL ESTIMATED CONSTRUCTION COST					Total
						$ 1,029,959.44

	GENERAL CONDITIONS					Total
	Estimating/Design Contingency	5.0%				$ 51,497.97
	General Conditions/OH	10.0%				$ 102,995.94
	Building Permit					$ 8,000.00
	Liability Insurance					$ -
	Builder's Risk Insurance	0.60%				$ 7,154.72
	GC/CM Profit	6.0%				$ 71,976.48
	Payment and Performance Bonds	1.65%				$ 20,981.15

	TOTAL ESTIMATED CONSTRUCTION COST	NCF PROTOTYPE 5 (Dome)				$ 1,292,565.71
	COST PER SQUARE FOOT					*$435.50*

ALTERNATE

Omit shutters and standard glass windows and provide hurricane/tornado resistant glass windows

Aluminum windows, 48" x 48", fixed, increased cost	8	ea	$ 540.00	$ 4,320.00	
Shutters, UL windstorm	(7)	ea	$ 4,935.35	$ (34,547.44)	
				$ (30,227.44)	

TECHNICAL REPORT #4

STORM SHELTER BASIS-OF-DESIGN

Northcountry Cooperative Foundation

Storm Shelter Prototype Redesign

June 6, 2022

Report Prepared By:

TSP Architects and Engineers
1500 Highway 52 North
Rochester, Minnesota 55901
507-288-8155

TSP Architecture Engineering Planning

INTRODUCTION

This Basis of Design (BOD) document describes the materials and requirements for consideration to be used by a contractor to provide budgeting for a potential storm shelter project. It is intended to be a starting point that is then refined and defined during the development of the design. This document will be updated during a project's development.

This BOD was developed utilizing the Park Plaza Storm Shelter as a starting point. The BOD describes the technical approach planned for the project and is incorporated into the project technical specifications.

Storm Shelters are governed in the State of Minnesota building under section 423 which references ICC-500. If a shelter has FEMA money associated with it, some additional design requirements are necessary.

The BOD is organized by specification divisions, which is he format a contractor is accustomed to seeing.

SUMMARY OF DIVISIONS

DIVISION 0 – PROCUREMENT

Procurement is essentially the recommended method of contracting with a contractor for the construction of the storm shelter. The recommendation is to identify a contractor that you have, or could have, a good relationship with and negotiate a fair and reasonable cost of the work.

DIVISION 1 – GENERAL REQUIREMENTS

The general requirements are other items that contribute towards the construction and outcome of the project that are not directly components of the actual construction of the storm shelter.

DIVISION 2 – EXISTING CONDITIONS

Existing conditions speak directly to the requirements for the demolition of any structure.

DIVISION 3 – CONCRETE

Concrete covers a variety of building elements including the floor and any precast concrete construction. Precast roofs are a common roof structure material for storm shelters due to their strength and capacity to resist adverse weather.

DIVISION 4 – MASONRY

If the building is constructed out of concrete masonry units ('cinder' blocks) and/or if the exterior material is brick. Masonry construction can be durable and provide a timeless aesthetic. Harder to modify in the future and therefore utilize it as the primary storm-resistant enclosure that is likely not change in the future.

DIVISION 5 – METALS

Generally, there is not a lot of metals on a storm shelter, however, it does include the lintels (structural support) over windows and any other miscellaneous metals that may be required during construction

DIVISION 6 - WOODS

Woods are another element that is not a major component in construction of storm shelters. It is generally used as a miscellaneous material, as required, to meet the requirements of the construction. Examples might be for blocking in walls to mount cabinets or televisions.

DIVISION 7 – THERMAL AND MOISTURE PROTECTION

Thermal and moisture protection are the elements that contribute to making the building watertight and energy efficient. This includes insulation, waterproofing, roofing material, etc.

BASIS OF DESIGN BY DIVISION

0. DIVISION 0 – PROCUREMENT

a. Contract
    i. Single-Prime General Contractor
        1. Negotiated Proposal

1. DIVISION 1 – GENERAL REQUIREMENTS

a. Quality Assurance
    i. State required special inspections and testing.
    ii. Additional Storm Shelter construction inspections required. (Table 1)
b. Operations and Maintenance
    i. Compile, organize and provide operations and maintenance manuals for all materials, equipment, and systems. Provide in both electronic and hard copy format. Manuals should be organized by division and labeled accordingly and clearly.
c. Geotechnical Investigations
    i. Soil borings will be required to be taken from the building site in order to have a lab test them and provide analysis of the conditions of the soil and to recommend a foundation type that is best suited for a particular site.
d. Training
    i. Provide training for Owner's on the following equipment
        1. HVAC Systems
        2. Emergency Backup Systems
        3. Lighting Controls
        4. Fire Alarm
        5. Storm Shutters
        6. Other shelter features as required.
e. Project Management
    i. Contractor to provide bi-weekly construction meetings, with agenda and minutes, to track progress and look ahead schedule
    ii. All communication should be channeled through Owner's Representative (Northcountry Foundation)
    iii. Pay Applications should be submitted monthly to the Architect for certification
    iv. Maintain a web-based construction management platform, such as Procore
f. Temporary Facilities
    i. Project site should be fenced off / barricaded daily and be locked up and secured during overnight hours.

g. Community Engagement
    i. Contractor to be involved with at least monthly updates and community engagement meetings to discuss the project and progress with community residents

2. DIVISION 2

a. Demolition (as required)
    i. Typically, this would be the removal of an old storm shelter or building in its entirety. Extent to be confirmed on a case-by-case basis.

3. DIVISION 3 – CONCRETE

a. Roof Assembly
    i. 4" Concrete topping with #4 @ 18" OC a top 10" precast concrete plank.
    ii. Vertical Plank Loads
        1. Superimposed dead = 58 PSF (includes topping
        2. Superimposed live = 100 PSF
        3. Wind uplift = 108 PSF
        4. Wind downforce = 24 PSF
    iii. Horizontal Plank Loads
        1. Wind parallels to each side 475 LB/FT
    iv. Dowel planks into sidewalls with #4 dowels (12" x 12") @ 48" OC. (See Detail A1 and A2)

b. Floor Assembly
    i. 4" Cast in place concrete slab on grade. Reinforce with #4 @ 18" each way atop 4" drainage course, atop engineered fill.

4. DIVISION 4 – MASONRY

a. Brick Requirements
    i. Size: Utility
    ii. Grade: SW
    iii. Type: FBS
    iv. Grout: standard colored grout
b. Cavity wall requirements
    i. Brick Ties – Heavy Duty
    ii. Through wall flashing
    iii. Weep vents top and bottom
    iv. Mortar net
    v. Cavity wall insulation
        1. 3" polyiso (R-18)

5. DIVISION 5 – METALS

a. Miscellaneous metals as required, including lintel over openings

6. DIVISION 6 – WOOD

a. Wood blocking as required for various assemblies or as required for backing in walls for wall mounted equipment and fixtures.

7. DIVISION 7 – THERMAL AND MOISTURE

a. Roof System
    i. Fully adhered EPDM roof with mechanically fastened insulation
        1. Average R-Value = R-30 (approximately 6” of insulation average)
    ii. Storm water drainage: scupper with downspout and splash block.

b. Below Slab / Below Grade insulation
    i. Insulation down to footing and to a point 4’-0” around perimeter of foundation walls under slab.
        1. 2” poly iso; type IV

8. DIVISION 8 – OPENINGS

a. Doors and frames:
    i. Standard Doors: typical Hollow metal doors with fully welded frames. Hardware to be commercial grade.
    ii. Storm Doors: To meet requirements of Windstorm Rated Assembly ZHLA.45
    iii. Product: Assa Abloy 1-3/4” StormPro 361
        1. Door and Frame
        2. Hardware
        3. Anchoring details: (Detail A5)

b. Storm Shutters: To meet requirements of Windstorm Rated Assembly ZHLA.46
    i. Product: Assa Abloy 1-3/4” StormPro Shutter
        1. Shutter and Frame
        2. Hardware
        3. Anchoring details: (Details A3 and A4)

c. Louvers: To meet requirements of Windstorm Rated Assembly
    i. Ruskin XP500; 24” x 24”

d. Penetration Protection: for any other penetrations in the shelter envelope,

11. DIVISIONS 26-28- ELECTRICAL

a. General Power
    i. Provide typical out lights and switches as required.

b. Lighting
    i. General Lighting: Kenall 1'x4' surface mounted wrap around
    ii. Exit Lighting: Light Alarms – AC Powered LED Exit Sign
    iii. Exterior Lighting: Williams – Exterior LED Walpack with integral photocell

c. Backup power (2 hour run time)
    i. Ventilation Inverter: Light Alarms IPSSC-120M-12090ICBRS232-OCB0115
    ii. Lighting Inverter: Light Alarms 400W lighting inverter with self-diagnostics: LMIU-400

d. Fire Alarm System
    i. Manufacturers: Notifier, Simplex, Gamewell, Pyrotronics, Edwards
    ii. Addressable, analog, fully supervised Class 'B' system.
    iii. Integral battery
    iv. Main control panel: modular design, surface mounted

12. DIVISIONS 31-33 – CIVIL

a. Site Improvements
    i. Landscaping: Provide allowance for plantings
    ii. Turf Grass: Grass Seed
    iii. Concrete walks: standard 3500 psi concrete

b. Utilities
    i. Provide allowance for utility connection. Assume connections are nearby.

SECTION 01 44 00-2
ICC-500 107.3 QUALITY ASSURANCE PLAN

Storm Shelter Quality Assurance Plan Summary Schedule

Project Name: <Name>

Location: <Address>

Section 107.3.1	Section 107.3.2					
	Main Windforce-resisting system or wind resisting component	Inspections / Testing required per 106.2	Type and Frequency of Testing	Type and Frequency of Special inspections required	Structural Observations per 106.4	Required distribution, type and frequency of reports
1	Roof cladding, soffits and roof framing connections	N/A	N/A	Visual / after install	YES	Written report, after occurrence, distribute to owner, contractor, designer of record and AHJ
2	Wall connections to roof and floor diaphragms and framing	N/A	N/A	Visual / after install	YES	Written report, after occurrence, distribute to owner, contractor, designer of record and AHJ
3	Roof and floor diaphragm systems, including connectors, drag struts and boundary elements	N/A	N/A	Visual / after install	YES	Written report, after occurrence, distribute to owner, contractor, designer of record and AHJ
4	Main wind force resisting systems, including braced frames, moment frames and shear walls	N/A	N/A	Visual / after install	YES	Written report, after occurrence, distribute to owner, contractor, designer of record and AHJ
5	Main wind force-resisting system connections to the foundations	N/A	N/A	Visual / after install	YES	Written report, after occurrence, distribute to owner, contractor, designer of record and AHJ
6	Fabrication and installation of components and assemblies of the shelter envelope required to meet missile impact tet requirements of Chapter 3	N/A	N/A	Visual / after install		Written report, after occurrence, distribute to owner, contractor, designer of record and AHJ
7	Wall cladding and wall cladding connections	N/A	N/A	Visual / after install		Written report, after occurrence, distribute to owner, contractor, designer of record and AHJ
8	Corrosion resistance or protection of exposed metal connectors providing load path continuity	N/A	N/A	Visual / after install	YES	Written report, after occurrence, distribute to owner, contractor, designer of record and AHJ
9	Critical support systems and connections and debris impact protection of the components and connections	N/A	N/A	Visual / after install		Written report, after occurrence, distribute to owner, contractor, designer of record and AHJ

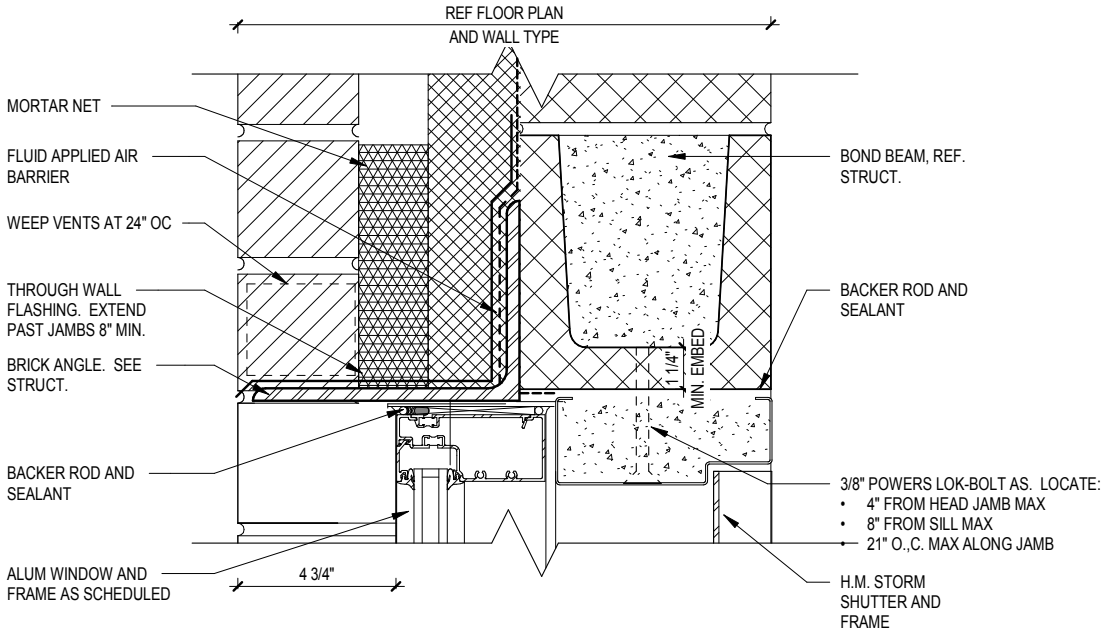
10	Foundation design	N/A	N/A	Visual / after install	YES	Written report, after occurrence, distribute to owner, contractor, designer of record and AHJ

Note:

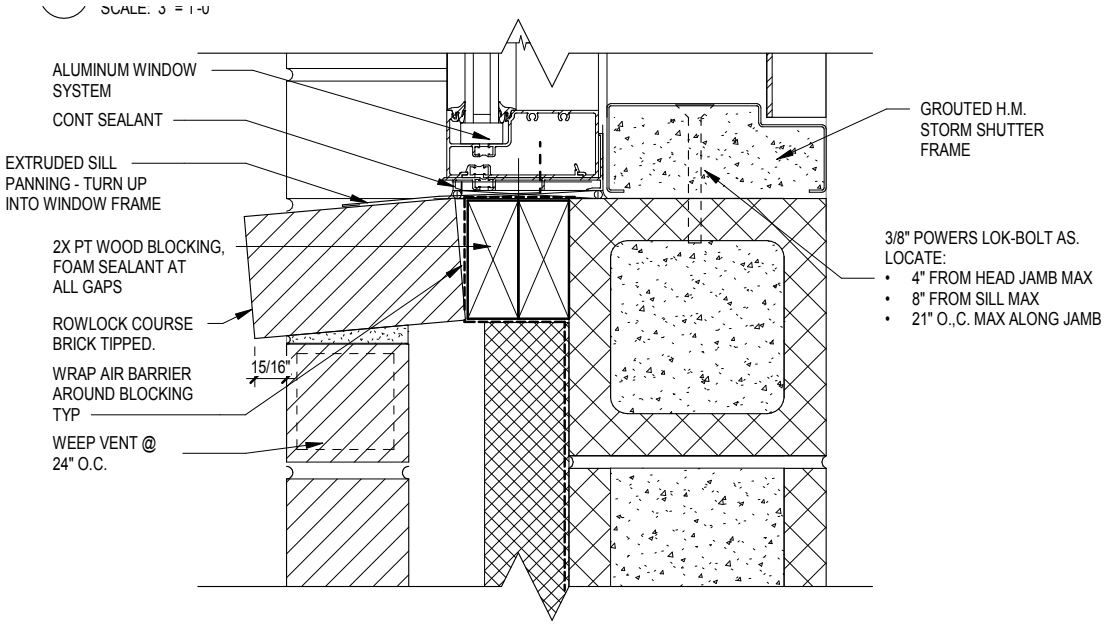
1. After review of structural observations per 106.4, deficiencies shall be reported in writing to the owner and to the authority having jurisdiction. At completion design professional who made the observations will submit to the AHJ a written statement that the site visits have been made and shall identify any reported deficiencies that have not been resolved.

2. Per ICC-500 - 107.3.3 each contractor responsible for the construction, fabrication or installation of a main wind force resisting system or any component listed in the plan shall submit a written statement of responsibility to the AHJ, the responsible design professional and the owner prior to commencement of work. The statement of responsibility shall contain the items identified in the ICC-500 107.3.3

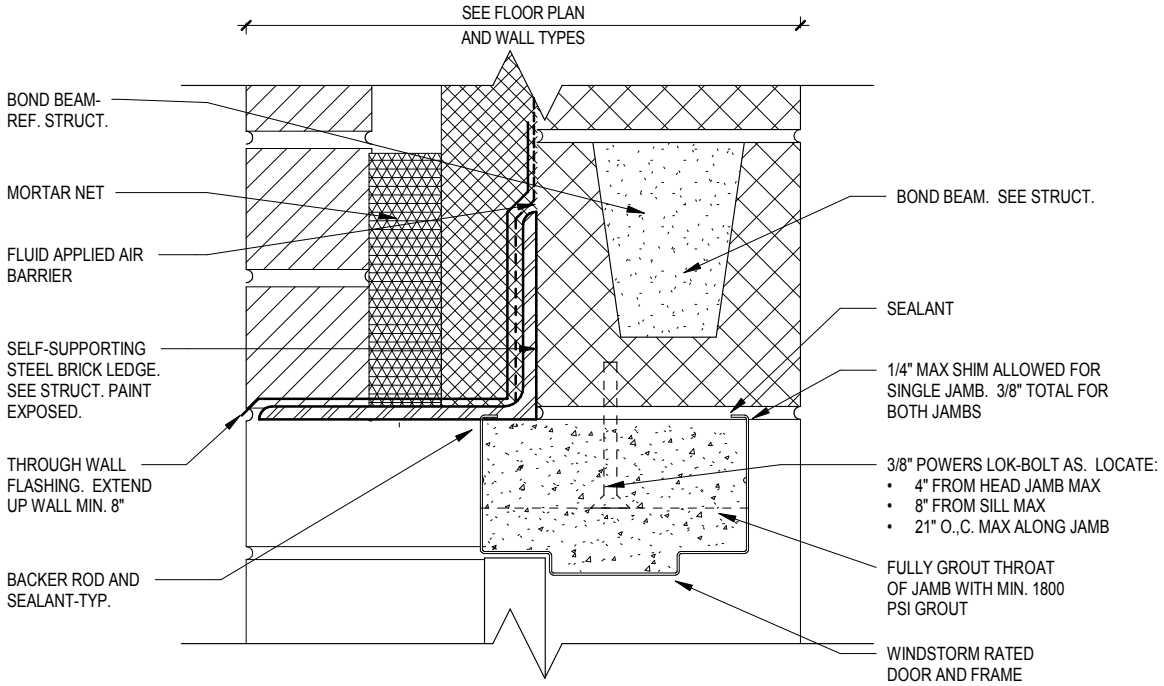
END OF ICC-500 107.3 QUALITY ASSURANCE PLAN



DETAIL A3



DETAIL A4



DETAIL A5

FINISH KEY

CODE	DESCRIPTION	MANUFACTURER	PATTERN	COLOR	COMMENTS
APC-1	ACOUSTICAL CEILING PLANELS	USG	ASPEN BASIC ACOUSTICAL PANELS	WHITE	
CG-1	CORNER GUARD	INPRO	TAPE-ON CORNER GUARD	CADET BLUE 0134	4'-0" LENGTH. INSTAL DIRECTLY ABOVE RB-1
CT-1	CERAMIC WALL TILE	CERAMIC TILE WORKS	UNION	ICE 12X24	ACCESSORIES: SCHLUTER-DILEX-AHK, AND QUADEC - BASE AND FINISHED EDGE
P-1	PAINT	SHERWIN WILLIAMS	-	BIG CHILL SW7648	
P-2	PAINT - METAL DOOR FRAME	SHERWIN WILLIAMS	-	URBANE BRONZE SW0748	
P-3	PAINT - ACCENT	SHERWIN WILLIAMS	-	INKY BLUE SW9149	
PL-1	PLASTIC LAMINATE	WILSONART	-	PALISADES OAK 7987-78	FINE GRAIN FINISH. 3MM EDGE BAND: DOELLKEN-WOODTAPE 5891 RIVER CHERRY
PT-1	PORCELAIN FLOOR TILE	CERAMIC TILE WORKS	UNION	GRAPHITE 12X24	ACCESSORIES: SCHLUTER-RENO-U & DILEX-AHK - TRANSITION STRIP, COVE BASE
RB-1	RESILIENT BASE	NORA	-	6294 STONE GREY	
RSF-1	RUBBER SHEET FLOORING	NORA	NORAPLAN DEGREE	6325 SACRAMENTO	48" WIDE ROLLED GOODS. HEAT-WELD SEAMS WITH COLOR NORAPLAN SENTICA 6531
RSF-2	RUBBER SHEET FLOORING	NORA	NORAPLAN DEGREE	6331 OLYMPIA	48" WIDE ROLLED GOODS. HEAT-WELD SEAMS WITH COLOR NORAPLAN SENTICA 6523
SA-1	SPRAY ON ACOUSTICAL TREATMENT	SONAKRETE	-	STANDARD WHITE	0.75" THICK (XXX NRC)
SCONC	SEALED CONCRETE	-	-	-	
SS-1	SOLID SURFACE - COUNTER	LG HAUSYS HI-MACS	-	L014 GEYSER	

DETAIL A6