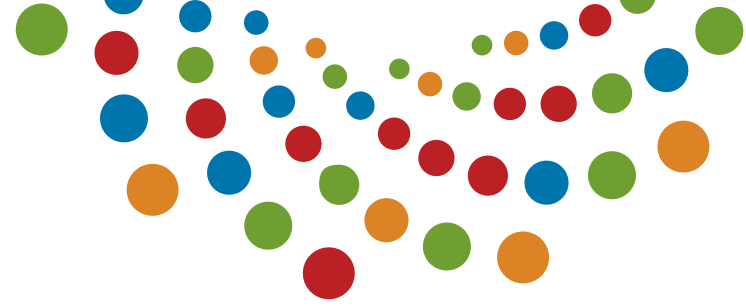


Resiliency Among the Ruins:

MEWS' Journey Forward Following the December 2021 Tornado

MAYFIELD ELECTRIC & WATER SYSTEMS
ELECTRIC • WATER • WASTEWATER • FIBER INTERNET





On December 10, 2021, a severe late-season tornado outbreak spawned 61 confirmed tornadoes, spinning them across portions of the South, Midwest, and Tennessee and Ohio Valleys. Beginning in Northern Arkansas then moving into Missouri, Illinois, Tennessee, and Kentucky, the tornados left a wake of catastrophic damage and death.

At 9:10 p.m. CST on December 10, the National Weather Service station in Paducah, Kentucky issued a warning saying, "If you live in or near Mayfield, Kentucky, get underground if you can. Take shelter now!" Seventeen minutes later, they declared a tornado emergency, the most extreme warning issued by the NWS which read: "Tornado Emergency for Mayfield. A violent tornado is moving into the city of Mayfield. TAKE SHELTER NOW!"

Radar analysis showed debris lofted up to 30,000 feet into the violent EF4 tornado as it struck Mayfield. Tearing directly through the heart of Mayfield's historic downtown commercial district, the tornado ravaged three historic churches, numerous well-built brick buildings including the historic 133-year-old Graves County Courthouse, demolishing anything in its path and leaving piles of rubble in its wake. Mayfield's fire station, police station, and city hall were all destroyed. Entire neighborhoods were wiped out. In all, 22 Mayfield residents lost their lives.

Mayfield Electric and Water System was severely impacted. The tornado demolished its substation, internet, water and wastewater facilities. The storm brought down hundreds of poles and miles of power lines. Additionally, the storm knocked down the system's elevated water tank and destroyed the main office building. More than \$45 million in MEWS infrastructure was damaged or destroyed.

Nearly four years later, we continue to rebuild Mayfield Electric and Water System assets, and indeed, our community, to be stronger than ever. This is our story.

It is dedicated to the hardworking employees of the Mayfield Electric and Water System and the mutual aid workers who assisted our city in the immediate aftermath of the December 10 tornado. Your resilience and determination have been vital to Mayfield's recovery.

Thank you,

Marty Ivy
General Superintendent
Mayfield Electric & Water System



"A large, violent damaging tornado...the kind of tornado you only see in movies is crossing the Mississippi right now and moving into Tennessee," said storm analyst Ryan Hall at approximately 8:15 p.m. CST on December 10, 2021, during his hours-long weather webcast.



Hall, like so many others that night, was tracking a powerful supercell storm system that formed in the central United States that afternoon and began moving East. Significant long-track tornadoes began taking shape along the line of storms.



The tornado Hall mentioned, had begun near Jonesboro, Arkansas, causing major damage as it moved through Monette and Leachville, Arkansas. It crossed through Missouri, before jumping the Mississippi River into the northwestern corner of West Tennessee.



As that tornado dissipated, a potent EF4 tornado with winds up to 190 mph formed from its remnants.

Before the night was through, that single tornado would cut a path of destruction through 11 counties in Western Kentucky that was nearly 165.7 miles long—the longest recorded path for a tornado in U.S. history.

Zero Hour

At 9:25 p.m. that night, the tornado launched itself toward Mayfield, Kentucky, moving parallel to Purchase Parkway and Highway 45. At 9:26 p.m. the National Weather Service in Paducah issued a tornado emergency for Mayfield and at 9:27 p.m., the tornado began its deadly assault on Mayfield, tearing through the city's electric and water infrastructure, including the only electric substation, plunging the community into darkness.

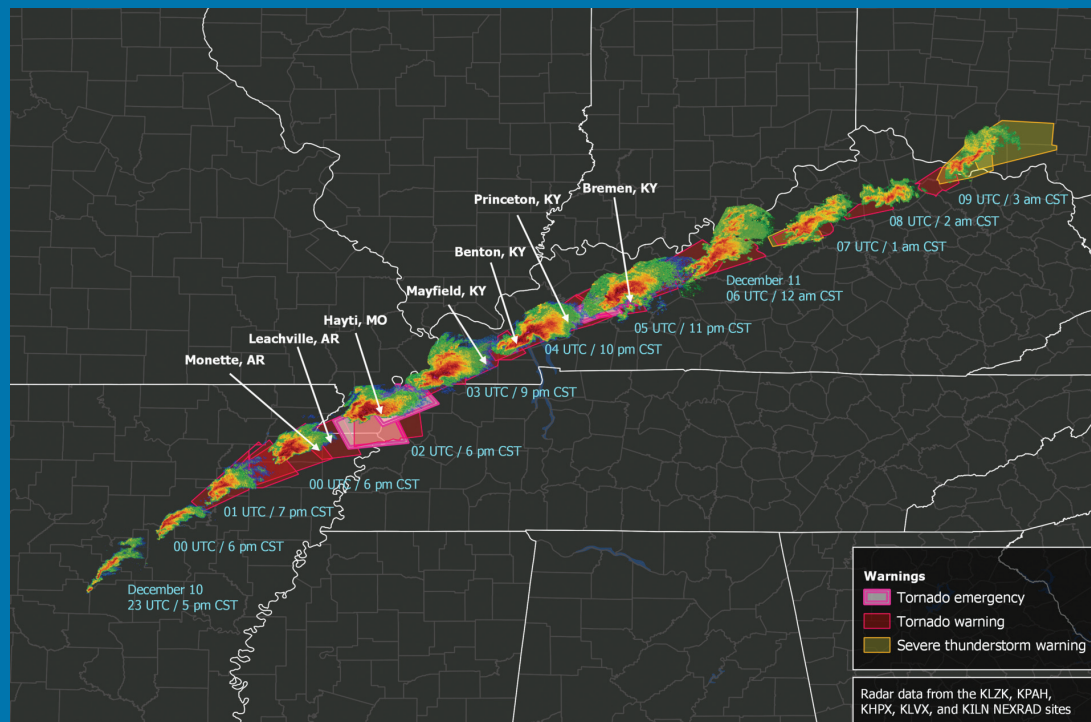
As the tornado took aim at the city, meteorologists Noah Bergen and Trent Okerson at WPSD-TV issued a take cover warning to all of Mayfield. Their actions saved many lives. Still, 22 residents died. The tornado destroyed 481 homes and damaged another 1000. At Mayfield Consumer Products 110 people were trapped and eight died. The city's court square was turned to rubble. The fire and police stations were leveled and the 133-year old clock tower atop the Graves County Courthouse was toppled.



This is Mayfield's Story

- This is not just a story of destruction but a testament to the people of Mayfield, and especially to the employees of Mayfield Electric & Water Systems, who, when facing the wreckage left in the storm's wake, stepped forward immediately to begin restoring the life-saving essential services Mayfield's residents depend on.
- It is also the story of creative and forward thinking that is delivering an updated, modern infrastructure designed to withstand future storms and serve the community of Mayfield now and well into the future. Not only do we offer this account to stand witness to the loss and destruction this community endured, but to highlight the resilience of the people of Mayfield EWS and the rebuilding effort that followed. May it stand as a symbol of hope honoring the strength, resilience and dedication of this community.

Mapping the Mayhem



Site 2 – MEWS Electric Substation

Total Estimated Damages: \$6.1 million

The tornado skipped across a field separating the water warehouse and substation, destroying the town's only electric substation as well as seven buildings on the site including a switchhouse and the electric warehouse.

Site 2 Damage:

- Substation transformers, switches, banked transformers and structural steel severely damaged (\$710,000 in damages)
- Perimeter fences destroyed (\$60,000 to repair and/or replace)
- Lost circuit breakers and capacitors in warehouse (\$70,000)
- Spare transformers lost or destroyed (\$30,000)



\$6.1
MILLION

Site 1 – MEWS Water Warehouse

Total Estimated Damages: \$5.23 million

The MEWS water warehouse, an open-span metal building that housed much of the water department's inventory, as well as pumps, a one-million-gallon ground storage tank, plus a vacuum truck, pick-up trucks and other heavy equipment, was the very first site struck by the tornado as it entered Mayfield.

Site 1 Damage:

- The building was completely destroyed, along with all perimeter fencing of the site (Rebuilding costs \$4.6 million)
- Damage to the water tank included the hatch and ladder being ripped off, surface damage, and debris getting into the tank requiring use of a crane for removal (\$169,408 in repair costs)
- Additionally, almost all water department inventory including pipes, clamps, meter lids and many other items were lost or destroyed (Cost of lost material totaled \$400,000)
- Perimeter fence destroyed (\$52,000)

\$5.23
MILLION



Site 3 – MEWS Water Treatment Plant

Total Estimated Damages: \$4.2 million

From the electric substation site, the tornado continued on its northwest path damaging three buildings at the town's water treatment plant and destroying one. In addition to structural damage and destruction of buildings, supply wells that provide water for the city were damaged with their covers being ripped off; the concrete reservoir was damaged; the water plant's lab was destroyed; a generator was destroyed; and a shop building, water department trucks, a trailer, and other heavy equipment were destroyed.

Site 3 Damage:

- Chemical building roof ripped off (\$50,000)
- Concrete reservoir damaged (\$100,000)
- Water plant lab destroyed (\$3.25 million)
- Generator destroyed (\$50,000)
- Supply wells damaged (\$170,000)
- Shop building destroyed (\$288,000)
- 26 fleet vehicles plus 12 pieces of heavy equipment destroyed (\$188,000)
- Miscellaneous property-in-open damaged (\$70,000)



\$4.2
MILLION

Site 4 – Mayfield's 12th Street Water Tank

Total Estimated Damages: \$2.6 million

After demolishing the water treatment plant, the tornado collapsed the city's 600,000-gallon elevated water tank, spilling all of its contents. All perimeter fencing around the tank was also destroyed.

Site 4 Damage:

600,000-gallon steel water tank and fencing demolished (\$2.6 million)



\$2.6
MILLION

Site 6 – Farthing Street Communications Tower & Storage Facility

Total Estimated Damages \$259,000

MEWS relies on the 349-ft. tall communications tower to control its SCADA and AMI systems—vital aspects of operating the city's electric and water systems. The tower was not demolished but received heavy damage, as did a storage facility on the site.

Site 6 Damage:

- Guy-wire replacement to secure tower (\$77,000)
- Perimeter fencing repairs (\$12,000)
- Storage building damaged (\$170,000)



\$259
THOUSAND

Site 5 – MEWS Internet Warehouse

Total Estimated Damages \$1.8 million

After crushing the water tank, the tornado continued on its destructive path, decimating the utility's internet warehouse which housed inventory for the company's fiber division along with a bucket truck. The truck received severe damage, but remained salvageable while everything else in the facility and the building were lost.

Site 5 Damage:

- Internet warehouse destroyed (\$1.6 million)
- Fiber division inventory lost or destroyed (\$66,000)
- Bucket truck damaged (\$17,000 repair costs)



\$1.8
MILLION



Site 7 – MEWS Main Office

Total Estimated Damages: \$13.5 million

Built in 1955, the MEWS headquarters building was a charming mid-century architectural gem in downtown Mayfield. The building's stunning marquee—the second-oldest of its kind in the Tennessee Valley—proudly proclaimed that the city was energized by "TVA Power," a nod to the importance of TVA in delivering affordable, reliable public power to the region. The tornado ravaged the building, blowing out every window, ripping the historic sign in two, and destroying or severely damaging everything in the building including computers and some servers.

Site 7 Damage:

- MEWS main office destroyed (\$13.3 million)
- Office contents plus property-in-the-open destroyed (\$200,000)

\$13.5
MILLION

Site 8 – MEWS Wastewater Plant

Total Estimated Damages: \$4.6 million

After raining destruction on the court square, the tornado continued moving north where it launched its assault on the town's sewer plant. The facility's control center and laboratory both suffered severe damage after the building's roof was completely ripped off. Other buildings on the site also suffered extensive damage including the centrifuge building resulting in major damage to the centrifuge. Two clarifier tanks—equipment that removes solids from liquid—required extensive repairs, including removing a dumpster flung into one of the tanks by the tornado. The blower building, where oxygenation facilitates part of the biological process of wastewater treatment occurs, took on substantial damage. A UV lighting system that disinfects water was destroyed as were an equipment shed, a storage building for polymers used in the treatment process, and other miscellaneous inventory and equipment.

Site 8 Damage:

- Control center and laboratory damaged (\$1.3 million to restore functionality and replace electronic control panel)
- Centrifuge building damage (\$800,000)
- Centrifuge damage (\$150,000 to repair)
- Clarifiers damaged (\$1.1 million)
- Blower building damaged (\$25,000 to repair)
- UV light system destroyed (\$600,000)
- Polymer storage building destroyed (\$125,000)
- Perimeter fence destroyed (\$112,000)
- Two backhoes damaged (\$250,000)
- Miscellaneous materials, inventory and property-in-the-open destroyed (\$95,000)



**\$4.6
MILLION**

Bringing Order to Chaos

In the hours immediately after the tornado, MEWS General Superintendent Marty Ivy and his team of managers and staff began assessing damage and organizing a plan to restore electricity, water and internet services to their community. Ivy, who had taken his organization through the outages and damage caused by the 2009 ice storm that struck Western Kentucky, engaged the lessons learned from past experience and immediately began applying that knowledge to the present situation.

The first thing he did was work with his staff, including Administrative Assistant Heather Payne and Finance Managers Kellie Green (Electric and Internet) and Kristie McAdoo (Water and Wastewater) to find safe, warm temporary housing for MEWS employees and their families at hotels in a neighboring community that did not get hit by the tornado. One hundred hotel rooms were booked for mutual aid workers and displaced employees.

So, began months of Ivy and the MEWS team working 12 to 16 hours each day, seven days a week to help their town recover.





Clint Woodward, MEWS Electric Operations Manager

"When the tornado hit, we had crews working some isolated outages prior to the tornado," said Clint Woodward MEWS Electric Operations Manager. "My first priority was to find those line crews and make sure they were safe."

Woodward located those crew members—including one who sheltered in an underground vault at the electric substation which took a direct hit—then made his way to the MEWS main office. That office also suffered severe damage which knocked out the SCADA system normally used to identify outages. Woodward and his staff immediately put boots on the ground to assess damage. The scale of destruction was staggering, with over 450 downed poles and extensive damage to power lines across the community.

What they found at the substation site defied imagination. Debris had penetrated a transformer, causing an oil leak. All the breakers and buswork, as well as insulators and switches in the substation were destroyed. Beyond the substation, all the main feeder lines were down.

At the electric warehouse, the department's trucks, needed to start repair work, sat inaccessible, beneath heaps of twisted metal. Inventory was either destroyed or scattered for miles. Wondering "where do we start now," Woodward called Brent Schultz, Water/Wastewater Operational Manager, to borrow an excavator only to learn that the water department was facing the same extensive damage.

"I have participated in a lot of mutual aid operations for other systems. I have never been anywhere that had all of their utility facilities completely destroyed like this," said Woodward.

The darkness of the first night without TVA transmission lines underscored the magnitude of the disaster. "The next morning," Woodward said, "we could see the full extent of the damage and knew it was more than we could handle alone."

Woodward reached out to TVPPA, the association that provides services and support for the 153 utilities that purchase wholesale electricity from TVA, and to the Kentucky Utility Authority for assistance. "I specifically asked TVPPA for help from crews who could bring special off-road equipment to help with our lines in wetlands and farm fields. They came through."

Help also came from friends closer to home. Neighboring West Kentucky Rural Electric Cooperative Corporation allowed Mayfield to connect to their undamaged substation located directly across from Mayfield's. With about 95% of lines feeding the north part of the town and their hospital still intact, being able to connect to West Kentucky's substation allowed Mayfield to keep the hospital and part of the town up and running.

Every day for the next several weeks, Mayfield line crews, joined by mutual aid workers, logged 16-hour shifts setting poles, stringing line, hanging transformers and getting the lights back on.

Employees from other departments pitched in, backfilling holes, unloading deliveries, assessing damage, and working with vegetation management crews to identify and clean up areas that needed work before new lines could be set.

"Good still outweighs bad in this world," said Woodward, noting the commitment of MEWS employees who worked 16-hour days, sacrificing time with their families to serve their community along with the sacrifices made by mutual aid workers who gave up Christmas with their families to help complete strangers.



Brent Schultz, MEWS Water/Wastewater Operational Manager

Brent Schultz had literally just experienced his first day in his new role as Water/Wastewater Operational Manager when the tornado struck. If ever there was a trial by fire, he was about to experience it.

The first task facing Schultz and his team was restoring the ability to pump water. Due to the severe damage the high service pumps took, this required piecing together several damaged pumps to make them functional.

Finally, with pumps operational they needed to restore pressure and without

SCADA to assist, this is where, said Schultz, "it felt like going back in time."

"Without SCADA, if you're trying to fill a tank, you run the risk of overflowing another tank. It's like flying blind."

The destruction of the city's 600,000-gallon elevated water tower complicated efforts to restore water pressure.

In addition to serving the city of Mayfield, MEWS provides water and wastewater services throughout all of Graves County. Without SCADA to assist, Schultz and his crew along with some volunteers walked from house to house and business to business throughout the 500-square mile service area to open and close water valves manually in order to restore water pressure. He also brought in two retired MEWS employees who had experience operating the water treatment system prior to the introduction of SCADA to assist his staff.

Working around the clock for three days, MEWS Water Department crews had water flowing, albeit under a boil water advisory, within 72 hours after the tornado hit. Using the department's mapping system, mutual aid crews assisted MEWS crew members by going house to house to manually restore water service.

Wastewater resources were even more severely impacted by the tornado and took more effort to get up and running. Crews had to bring in a crane to remove a dumpster that had been thrown into a clarifier. The centrifuge used to remove solids from water had been damaged when the building that housed it was destroyed.

Schultz credits help from the Joint Sewer Agency and neighboring Paducah Water Systems for their assistance in rebuilding the clarifiers. Additionally, extensive work was required to salvage the wastewater treatment laboratory and restore its functionality. Because the UV filters used to kill harmful bacteria and other parasites were destroyed, the department had to resort to using parasitic acid to treat wastewater. By using creative solutions even under these trying circumstances, the department was able to get back into regulation within a week of the tornado.

Once water service was restored and wastewater restoration efforts were well underway, Schultz was able to divert some water department employees to assist with setting poles for the electric department.





**Megan Arnold,
MEWS Customer Service
Manager**

"Immediately after the tornado, I saw on social media that Mayfield had taken a direct hit," said Megan Arnold, MEWS Customer Service Manager. "I started trying to find out how bad our outages were by calling Brent Schultz who had overseen customer service before moving to the water department, but he didn't know the extent of the damage yet." Next, Arnold called the after-hours call center and learned that calls were coming in from all over the city. It seemed there was a system-wide outage.

Arnold coordinated with Water Department Finance Manager Kristie McAdoo and by 6 a.m. the next morning they were in a nearby Sam's Club buying bottled water and snacks for the city's line crews. Getting into Mayfield required several tries to find a clear route. "When we came over the hill on Highway 45, it looked like something from a movie...the whole town was just gone," she said.

She and other customer service and front office staff began trying to salvage anything they could from the main office, digging through debris and recovering any items vital to operations. Phone calls were routed to employee cell phones and they were fielding customer calls and giving the only response they could in those first early hours: "Our substation took a direct hit and we don't know when we will have power restored."

For the next several weeks, Arnold's primary focus would become keeping the community, first responders, and the media updated on the progress being made by MEWS crews to restore electricity, water, sewer, and internet service.

"Our crews were working non-stop and everyone could see that," Arnold said. "Water crews were going around to

all the buildings that were destroyed and shutting off the meters by hand. I participated in all the Emergency Operations Coordination meetings, giving updates twice daily .

"You never think a tragedy like this will happen in your own town or to people you know. Happening when it did made it especially tragic; you could see people's Christmas trees flung into road," said Arnold.

But, there were blessings, too, she noted.

"As a company, we really came together as a team. We didn't think about the idea of roles; everyone jumped in and did what needed to be done. We made sure everyone on our staff had what they needed. And we worked around the clock to take care of our customers. We didn't have our portable office set up, which TVA helped to provide, until late December and when we did get it, we had six customer service reps working in a tiny trailer. But we didn't mind; it brought us closer together."



**Kelly Green,
MEWS Electric & Internet
Department Finance
Manager**

In the immediate aftermath of the tornado, Kelly Green and Kristie McAdoo, both MEWS Finance Managers—with help from Administrative Assistant Heather Payne—took on the massive task of finding shelter for MEWS staff and their families as well as for the more than 250 mutual aid workers who came from all over the country to support Mayfield and its citizens.

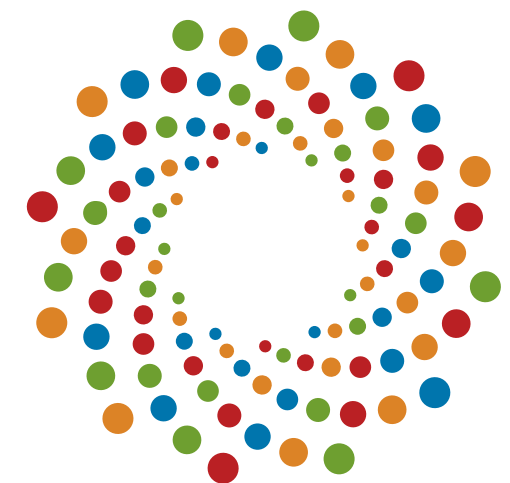
"We were on the phone calling every hotel and motel we could and many of them were already booked up. We reserved every room we could. We were fortunate, too, that TVA stepped up and allowed people to sleep in their service center in Hickory, Kentucky. We also rented portable toilet trailers for each of our locations," said Green. "And then we had to plan a way to feed everyone," she added.

Green elaborated, "One of the financial challenges in a situation like this is that in order to be reimbursed by FEMA, you have to keep a log of everyone who eats. With our mutual aid responders rolling in and out, we just didn't have a good way to keep track of every individual person that we fed. Thankfully, our insurance

coverage includes an 'extra expense' coverage for things that FEMA won't cover so we were able to use that to pay for food. And Kristie, myself, Heather, and our CSR reps showed up every day to serve meals, bring snacks and water, and make sure these crews were taken care of as best as we could."

They point out that MEWS staff worked 16-hour shifts, seven days a week, for many weeks. "Christmas didn't matter. We were all just focused on helping our community, although, Marty insisted crews only work eight hours on Christmas Day and spend some time with their families," said McAdoo.

And as Megan Arnold noted, Green and McAdoo, were quick to recognize the goodness this tragedy revealed. "Not only did we see line crews leaving their families during the holidays to come help our community, but someone—and we don't know who it was—started an Amazon wish list with items like snacks and bottled water for the line crews and every day for a while we were getting deliveries with items to support our workers."



**Kristie McAdoo,
MEWS Water &
Wastewater Department
Finance Manager**

**"You never think a tragedy like
this will happen in your own town
or to people you know."**



“It was as close to a nightmare as you can get.”



**Mike Hodges,
MEWS IT Operations
Manager**

Out of all the damage and destruction Mayfield Electric and Water Systems faced, there was one small bit of good fortune. Although the tornado destroyed the utility’s main internet feeders and the shop that included the data center on its path of havoc, a new data center, designed as an essential services facility built to withstand tornado-force winds, was already under construction.

“It was as close to a nightmare as you can get,” said Mike Hodges, IT

Operations Manager. “We had to cut fiber off with bolt cutters and cut off jumpers and label them. But, we also had some bright spots...we were planning to build a new core in the new data center and the equipment had already been delivered. Thankfully, none of the new equipment was damaged even though it had been stored in our main building where the roof had been ripped off and all the windows blown out.”

In addition, the company’s internet warehouse had been destroyed along with most of its inventory. A bucket truck stored inside the warehouse even had a steel beam wrapped around it, rendering it useless.

On the upside, Hodges pointed out that he was able to work with contractors to help pull wire and get the data center set up. They were able to connect to a generator and quickly get the office network up and running. In the meantime, he said, “We had a few poles near the data center that were still standing, so our contractors were able to start connecting to those. TVA and internet vendor CSA came to support us by setting up a mobile hot spot, and with the help of our contractors, we were able to get our new data center up and

running and establish our feed before they got the hot spot set up.”

“It was a big deal for us to get the fiber in and get it spliced over and connected to the right switches. We had a lot of challenges...we had to use alternate routes, either because the original route was inaccessible or didn’t have poles set, in order to get our splicing right. Once that was done, we started connecting customers outside the city in areas that weren’t hit by the tornado,” said Hodges.

The town’s city hall, fire department, and police department—whose buildings were all decimated by the tornado—were all fed by the MEWS fiber network. “We scrambled to get their temporary offices, as well as essential businesses on the city’s south side, connected,” said Hodges.

“The north side of town took longer,” he added, “because we had to wait for the poles to be set. But as soon as they were set, we’d jump on and connect fiber to get as many home customers reconnected as possible.”



**Marty Ivy,
MEWS General
Superintendent**

For General Superintendent Marty Ivy, overseeing the MEWS recovery efforts required coordinating multiple departments and ensuring the productivity and safety of more than 250 mutual aid workers who came to Mayfield to assist in reestablishing essential services.

Ivy made communication a priority. “I met with the manager of each

department daily to stay on top of their progress and any challenges they encountered. Then I met with Megan Arnold to share that information with her because clear communication with our community and our recovery partners was crucial.”

Arnold compiled all the information shared by each department into a press release she presented at daily EOC meetings, ensuring everyone had the same information.

Ivy also noted the value of two-way communication with first responders. “The information our police and fire departments, and the National Guard, gathered at their checkpoints and the welfare checks they did throughout the community was invaluable to us. It gave us insight on where we still didn’t have power and they kept us aware of which roads were open or closed so we could plan routes and know where it was safe to work.”

Communication and coordination between Ivy’s staff and liaisons from the State of Kentucky, TVA, FEMA, TVPPA, and a host of other organizations were critical to every aspect of recovery.

But for Ivy, taking care of and supporting his staff and the line crews who came from all over the country to help get electric service back up and running was one of the most important.

“Making sure everyone returned home to their families was our top priority. The selflessness of our mutual aid partners, who left their own families during the holidays to assist our community, is truly remarkable. It’s such an indescribable act of kindness. Providing housing, hot meals, and whatever else they needed was a major focus, and our MEWS staff went above and beyond to make it happen.”

“All 42 MEWS employees went beyond expectations to serve our community. We worked tirelessly, often 16-hour days, seven days a week. Time seemed to blur together. Despite personal losses—including my own parents’ home—every staff member showed up without fail. Our commitment to restoring services was unwavering, even as many of us grappled with personal tragedies. We understand the importance of supporting critical infrastructure, putting everything aside when disaster strikes. I hope our community knows that.”



Rebuilding: Mayfield Strong

Water Tank

MEWS had a new 600,000 gallon elevated water tank built and in service by February 2022, just one year and two months after the devastating tornado. Cost to rebuild: \$2.6 million

The destructive power of the December 10, 2021 tornado resulted in total insurance claims of \$20 million and FEMA claims of \$25 million.

Working around the clock, Mayfield staff had water service re-established within just 30 hours. They had sewer and Internet services functioning within three days. And in just seven to ten days following the tornado, most MEWS customers had basic electric service re-established. Once the initial recovery efforts were complete, Marty Ivy and the MEWS team moved on to building a system of even stronger, more reliable essential services for Mayfield citizens.

Just as city officials have announced the building of a new city hall complex to serve as an anchor for the old town court square, MEWS has plans for rebuilding its assets in order to serve the community for many more decades.

Each of the company's new buildings will be designed and built to essential services standards, meaning they will be built to last up to 75 or 100 years. Plus, each new building will offer added protection for employees and the business resources they house in the event of future severe weather events.

Unexpected Challenges & Miscellaneous Expenses

During the initial stages of their recovery, Mayfield Electric and Water Systems faced several unexpected challenges that complicated the already challenging situation.

Downed perimeter fences at MEWS facilities and thieves attempting to scavenge copper from downed power lines, meant they needed to hire additional security to prevent the theft of inventory and equipment.

Existing supply chain constraints caused by COVID-19 and labor shortages made replacing lost inventory extremely hard. Fortunately, vendors provided critical support by prioritizing deliveries and ensuring essential needs were met promptly.

Storing the replacement inventory necessitated the purchase of two buildings totaling \$2.1 million, along with \$130,000 for security fencing. Additionally, miscellaneous expenses included equipment rentals, the purchase of backhoes, backup generators, housing and feeding mutual aid workers, and reimbursing other utilities for mutual aid costs totaling between \$7 and \$8 million.

**All dollar amounts in this publication are engineering estimates only. Final costs will be determined during the bidding process for each building and/or equipment purchase.*





Water Treatment Laboratory

Estimated Cost to Rebuild: \$3.2 million

Construction of the new MEWS water treatment laboratory began on December 13, 2023. Situated in the 400-block of South 12th Street, the \$3.2 million state-of-the-art facility is slated for completion in the fall of 2024.

When finished, the new water lab will offer enhanced capabilities to improve efficiency and further ensure the safety and reliability of Mayfield's drinking water. A secondary, on-site state certified lab will allow MEWS to bring more water testing in-house, helping to improve testing times and reduce costs. In the case of water main breaks in the future, this in-house testing lab will also help reduce the duration of boil water advisories.

Additional features of the new lab include an entirely new motor control center, SCADA controls, and automated backup generation. And like all new facilities being built as part of the long-term MEWS recovery efforts, this building will be hardened to ensure it can withstand future severe weather events. Control centers will be housed in rooms with reinforced concrete walls, and the new backup generators will have a protective housing as well.

Upon completion of the laboratory building, construction and installation of a new 1-million-gallon Clearwell tank will begin. Clearwell tanks provide a reservoir to hold treated water as part of the final stage of water purification.

Complete rehabilitation of Mayfield's four service wells, three high service pumps, construction of the 600,000-gallon water tank and rehabilitation of the 1-million-gallon ground storage tank were all completed in the months following the disaster.

**\$3.2
MILLION**

Water Warehouse

Estimated Cost to Rebuild: \$4.6 million

MEWS' new water warehouse will be an energy-efficient essential services building, with features designed to offer protection in the event of future weather emergencies. The building will have a 75-to 100-year life span.

**\$4.6
MILLION**

MEWS Electric Warehouse

Estimated Cost to Build: \$5.2 million

To replace the destroyed electric warehouse that houses electric department inventory, MEWS purchased an existing warehouse on a property across the street from their substation. This building will be upgraded to accommodate the company's needs and will be outfitted to serve as a hardened and secure essential services building for the MEWS electric department crew.

**\$5.2
MILLION**

MEWS Internet Warehouse

Estimated Cost to Build: \$1.6 million

The new and improved warehouse facility will house materials, supplies and vehicles used by the MEWS Internet department and like the water and electric warehouses, will be built to exacting essential services specifications including hardened crew rooms designed to protect employees during severe events.

**\$1.6
MILLION**

MEWS Main Office

Estimated Cost to Build: \$13.3 million

MEWS headquarters will be moving into a new, state-of-the-art office space that will feature a bright, welcoming lobby, and expanded space for staff. As with the other facilities being rebuilt, the main office design will incorporate essential service standards and hardening features to ensure the safety of employees and to protect business resources. The new building will be built near the site of previous building wiped out by the tornado and in a nod to the company's history, plans include incorporating the historic marquee into the lobby design. Construction of the new facility is slated to begin in the fall of 2024 with a completion date planned for 2025.



**\$13.3
MILLION**

MEWS Wastewater Treatment Plant

Estimated Cost to Rebuild: \$3.7 million

The rebuild of the MEWS wastewater treatment complex will include three new buildings. The primary building will be a Wastewater Essential Services building that will include a new high-tech control center housed in a reinforced concrete room. There will also be a safe room shelter for employees in the case of severe weather.

In addition to the control center building, the wastewater complex will feature a new centrifuge building, also built to withstand severe weather and a new belt press—a key piece of machinery used to remove water from sludge as part of the wastewater treatment process.

**\$3.7
MILLION**

MEWS Pilgrim's Pride Substation

Cost to Build: \$8.1 million

This new substation will aid in the recovery of a vital Mayfield business, allowing the new \$53.5 million Pilgrim's Pride hatchery to support 1,300 new jobs in the community.

**\$8.1
MILLION**

Crit, Grace & Lessons Learned

With every tragedy, every challenging event, comes the opportunity to learn. For Marty Ivy and the rest of the Mayfield Electric and Water System employees, the lessons taken from two severe weather events over the prior 13 years helped to mitigate many of the challenges faced when the December 10, 2021 tornado hit. And the lessons learned in its aftermath will carry Mayfield into its future.

Ivy and his management team identified the importance of facility hardening and bringing buildings up to essential services standards. This process enhances critical infrastructure resilience against natural disasters ensuring vital services can function in severe conditions. Structures built to these standards can also endure from 75 to 100 years, protecting the investment of the community. This effort may involve:

- **Reinforcement of structural elements, such as walls, roofs, and foundations**
- **Installation of bracing, shear walls, and other structural supports**
- **Implementation of redundant systems and backup infrastructure like power supplies to ensure continuous operation in the event of a failure in one part of the facility**
- **Incorporation of flexible design principles to allow the building to sway without collapsing**

Woodward consulted with FEMA experts on ways to enhance the electric system's resilience. In addition to using steel poles and underground lines, MEWS has applied for a FEMA public assistance grant in order to build a new \$16.1 million substation. This will provide a secondary tie to TVA transmission lines, providing greater stability and reliability to the system for years to come, and helping to mitigate the impact of future severe weather events.

Schultz and the Water Department are also expanding their capabilities with a second in-house lab as part of the new water treatment facility. Plus, a new battery-powered technology will provide critical information if SCADA systems go offline.

Green and McAdoo view investments in new facilities and infrastructure as vital for their town's future. Currently, approximately 250 customers remain disconnected from MEWS systems because their homes or businesses were destroyed and have yet to be rebuilt. However, as residents and businesses return to the area, MEWS stands ready to reliably serve them.

On average, tornado recoveries take three to five years, but the aftermath of a devastating EF4 tornado like the one that struck Mayfield can prolong the process. Delays in FEMA or other funding can further complicate recovery efforts. Both finance managers are actively pursuing funding avenues and collaborating with FEMA to secure reimbursement for expenses incurred during the ongoing recovery.

McAdoo, Green, and General Superintendent Ivy express deep gratitude to the State of Kentucky, the Kentucky Emergency Management Agency, Governor Andy Beshear, State Senator Jason Howell, and State Representative Richard Heath for their unwavering support. Access to emergency funding, including State Aid Funding for Emergencies (SAFE) and the governor's discretionary funds, has been instrumental in sustaining MEWS during challenging times, even helping the company make payroll when revenue was diminished due to the tornado. Ivy emphasizes the importance of patience and perseverance in the rebuilding process, highlighting the meticulous planning and dedication required to restore a system developed over nearly 90 years. "We anticipate a brighter future for our community and MEWS," Ivy says. "The invaluable support received from various individuals and organizations, including TVA, TVPPA, KLC, KUA, the JSA, and mutual aid workers from across the Tennessee Valley and beyond was essential to Mayfield's recovery and we are deeply grateful for their assistance."





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