



ASSOCIATION OF
**DEFENSE
COMMUNITIES**

THE INNOVATORS

**Five Projects Defining
Military-Community Innovation**

March 2019

The future of military installations and defense communities will be defined by partnerships and technology. As we continue to see new projects that push the boundaries of what types of partnerships and technological innovations are possible, ADC's Innovators Program is dedicated to highlighting these groundbreaking projects, and sharing best practices from around the nation.

The projects chronicled in this report prove that innovation can take many forms. From New Jersey's water protection efforts on NWS Earle and Abilene's efforts to take waste management partnerships to a new level at Dyess Air Force Base in Texas, to an inspiring military spouse employment in Colorado Springs, creative industrial base innovation around Aberdeen Proving Ground in Maryland, and Connecticut's efforts to develop a consolidated Emergency Management Center with the naval base—these projects display a heightened level of creativity and ingenuity that will drive our bases and communities into the future.

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INDUSTRIAL BASE INNOVATION: BUILDING THE ADVANCED MANUFACTURING, MATERIALS, AND PROCESSES CONSORTIUM

Aberdeen Proving Ground & Harford County, Maryland

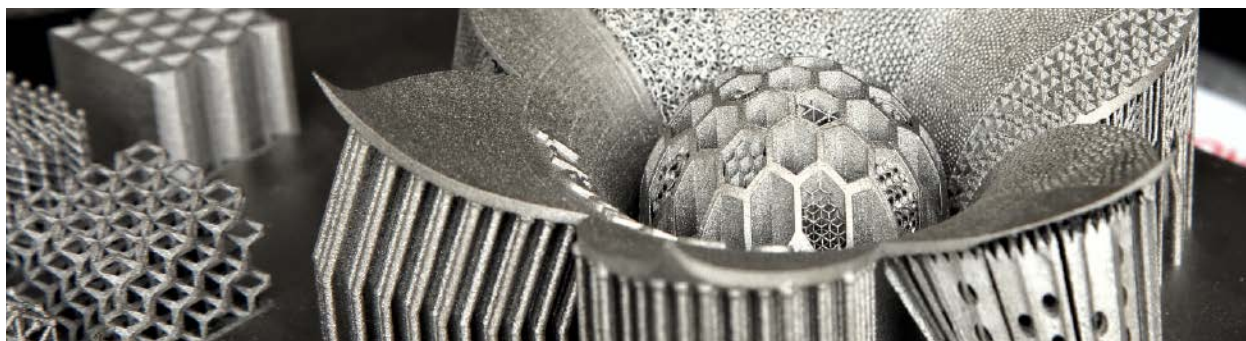
Defense research investments have led to innovations that have fueled American jobs and economic growth, improved health and bolstered national security since World War II – the internet, weather radar, GPS, transfusions, EpiPens, penicillin, duct tape, microwave ovens and Super Glue, for example.

The Army Research Lab (ARL) at Aberdeen Proving Ground (APG) in Harford County, Md., the Army's leading center for advanced technology development, has continued this tradition by supporting growth in areas of advanced manufacturing, such as additive manufacturing (AM). AM is already used by the services to fabricate hard-to-find replacement parts and for infrastructure, such as barracks and bridges. AM techniques have been employed in the medical, aerospace and automotive industries, among others. But ARL has reached beyond that to develop technological advances that can revolutionize the United States' large-scale manufacturing capabilities.

WHERE NONPROFITS, BUSINESS AND ACADEMIA INTERSECT

The National Center for Manufacturing Sciences (NCMS), a nonprofit formed in 1986 and whose members have a substantial manufacturing presence in North America, worked with ARL to launch the Advanced Manufacturing, Materials and Processes (AMMP) Program. A growing number of universities and businesses are joining the NCMS consortium to advance and enable AM to create next-generation manufacturing breakthroughs.

AMMP is designed to respond to requirements for affordable, complex parts that cannot be readily built. Corporate sector members joining AMMP include BAE Systems Land & Armaments, Honeywell International Inc., the Boeing Company, Applied Materials, 3D Systems, and GE Global Research. Academic participants include Johns Hopkins University, University of Maryland, Penn State University, University of Arizona, University of



Innovations in additive manufacturing are enabling 3D printing with new materials, including metals, with refined precision and detail, greatly increasing the possible use cases of these techniques. Image by Harford County Office of Community & Economic Development.

Delaware-Center for Composite Materials and University of Northern Iowa-Metal Casting Center.



(L to R): U.S. Senator Chris Van Hollen; 3D Systems Corp. Chief Technology Officer Chuck Hull; National Center for Manufacturing Sciences President & CEO Lisa Strama; Steve Pennington, former Managing Director, MD Dept. of Commerce; MD State Delegate Mary Ann Lisanti; Harford County Executive Barry Glassman; and U.S. Army Research Laboratory Director Philip Perconti in front of HEAT Center in Aberdeen, future home of the AMMP Consortium.

The consortium has recruited 30 members so far and is seeking to further expand industry involvement. After its launch in January 2018 with a cooperative agreement, AMMP concluded an other transaction agreement with ARL in late May to support engagement of nontraditional businesses that have not historically worked with the federal government. This collaboration has the potential to change how U.S. producers make aircraft, automobiles, munitions, medical devices and other equipment, while helping solidify Northeastern Maryland's future as a high-tech manufacturing hub.

Industrial level focus areas the consortium will pursue include essential science and technology for advanced manufacturing materials and processes, raw materials for advanced manufacturing, innovative design integrating advanced manufacturing processes, materials manufacturing science and technology for lethality, protection and

process visualization, sensing, probing and feedback toward real-time, additive process control.

VETTING THE IDEAS

NCMS will review white papers from AMMP members describing potential technical projects. Those that align with ARL goals will be submitted to the lab, which will solicit and compete full proposals from its membership under the NCMS/ARL contract to develop appropriate projects. NCMS has committed to reinvesting in the resources required to ensure that AMMP can continue to grow.

"NCMS brings a synergistic network through the AMMP membership that leverages cutting-edge science and delivers a holistic supply chain infrastructure for the AM ecosystem, allowing us to connect companies with innovative technologies and develop solutions to meet end users' requirements," said Karen Holt, federal installation administrator at the Harford County Office of Community & Economic Development. "Coupled with our collaborative power to partner small R&D companies with top-tier original equipment manufacturers, AMMP can develop, refine and provide user-centric solutions and ensure U.S. manufacturers stay at the forefront of global competition."

MARYLAND'S CONTRIBUTION TO THE NEXT BIG IDEA

The state of Maryland and Harford County have provided substantial support to help AMMP begin its mission. The county is providing a lease-free facility containing administrative and lab space in the Aberdeen

Technology Park, conveniently located near APG. This off-post location will allow academic participation by foreign nationals. Sen. Chris Van Hollen and a bipartisan team of Senators secured \$38 million in federal funding to support the consortium's collaboration with ARL. The county is seeking \$1 million in additional financial support from Maryland Gov. Larry Hogan to enhance this state-of-the-art facility, which launched in October 2018.

"American manufacturing is the backbone of our economy and is poised to help drive innovation in this critical sector," Van Hollen said. "AMMP's efforts on 3-D printing and other additive manufacturing technologies can help revolutionize the way we make things and spur economic growth and more good-paying jobs in our state and across the country."

ARL'S HISTORY OF COLLABORATION

This is not the first example of ARL reaching out beyond the fence line to develop solutions to address readiness challenges. In 2015, the lab launched a five-year collaboration with Drexel University in Philadelphia to identify the precursors to metal fatigue that affects aircraft, which is leading to other cooperative research at Army and civilian laboratories. ARL also established a pilot open campus near the University of Maryland in College Park, where academic, military and other government researchers can work together on advanced technology projects.

AMMP is just one example of the close and mutually beneficial relationship ARL has

nurtured with Harford County. In 2017, Harford County Public Schools received more than \$200,000 from the DoD Impact Aid program, which supports school districts with high numbers of federally connected students, APG Senior Commander Maj. Gen. Randy Taylor said. That year, APG employees participated in a science, technology, engineering and math school outreach program to draw attention to these disciplines and spur their interest in additive manufacturing-related careers at APG.

"NCMS will continue to provide state-of-the-art technology development to grow the workforce, address increasingly complex Army systems and leverage technology innovations," NCMS President and CEO Lisa Strama said. ■

WASTE NOT WANT NOT: A NEW CLASS OF WASTE MANAGEMENT INTERGOVERNMENTAL SUPPORT AGREEMENT

Dyess Air Force Base & Abilene, Texas

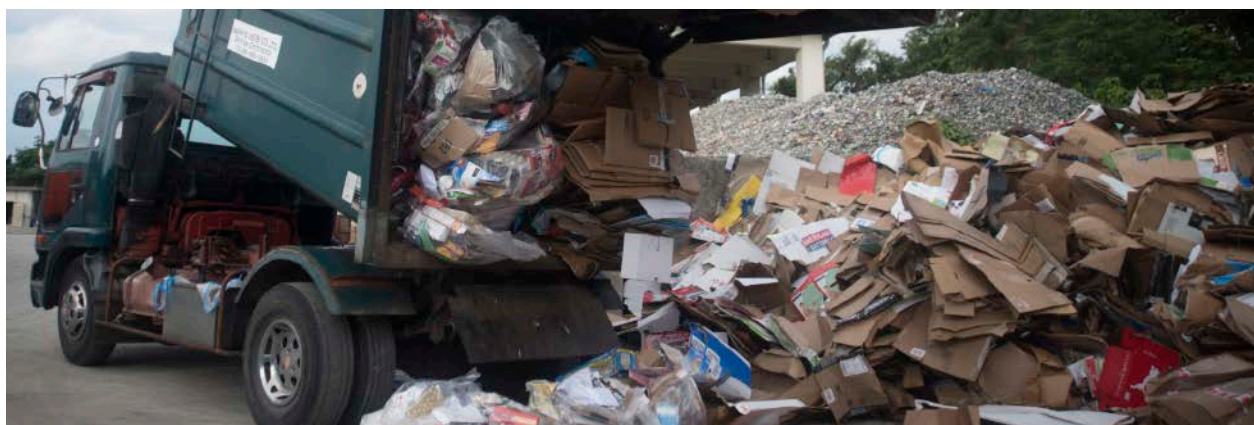
The Abilene, Texas, community has a long-standing record of supporting Dyess Air Force Base, starting with the \$900,000 it raised in the early 1950s to purchase 3,500 acres for a new installation on the site of a former military airfield. Since then, the city, primarily through the Abilene Military Affairs Committee, has supported Dyess and the military families stationed there through a variety of programs to enhance the base's military value. Community-led efforts have been aimed at bolstering spousal and veterans employment, upgrading on-base infrastructure and sharing municipal facilities such as local emergency operations centers.

Abilene established more than two dozen partnership agreements with Dyess in past decades. So local leaders were eager to explore more opportunities when Congress included an authority in the fiscal 2013 defense authorization bill allowing military installations and their host communities to enter into intergovernmental support agreements (IGSAs) for base support services.

The prospect of the city taking over responsibility for waste management and recycling services from the installation's existing contractor came up in initial discussions launched through the Air Force Community Partnership (AFCP) in 2014, but the community and Dyess did not begin studying the idea more closely until 2016. At that time, the Abilene Chamber of Commerce — the home of the Military Affairs Committee — hired two consultants to figure out what municipal functions had the most potential for a shared services partnership.

Waste management emerged as the top candidate primarily because the installation's deadline for renewing its existing contract was approaching and the city handled solid waste collection with its own staff and equipment, said Steve Bonner, president of SONRI.

"So it was going to be a clean transaction," Bonner said.



CRUNCHING THE NUMBERS

SONRI teamed with Meurer Municipal Consulting Services to conduct a cost-benefit analysis for waste management services for the city and Dyess, and later helped develop the IGSA the city ultimately negotiated with the base.

Before installation officials could recommend Dyess obtain waste services from Abilene, they needed to complete an AFCP business case analysis. The case for relying on the city was clear cut, with the analysis revealing the Air Force would save at least \$200,000 a year compared to the base's existing contract. Over the five-year term of the proposed IGSA, Dyess was projected to save between \$1 million and \$1.3 million.

The proposed IGSA was limited to five years as the law had not yet changed extending the maximum term limit for such agreements to 10 years. To take on the extra workload, the city determined it would need to purchase a new trash truck, at a cost approaching \$200,000, and hire a new driver, said Jim Winward, Abilene's public works operations manager. While trash trucks can last for up to seven years, the city never hesitated in its pursuit of an agreement which could end after just five years.

"The Abilene community was willing to take a risk. They didn't bat an eye to support the base," Bonner said, adding that the Air Force can renew the five-year agreement.

The IGSA — which covers solid waste collection, disposal and recycling collection — would provide the installation essentially the same level of service it received from its existing contractor. The base would need to make only "very minor adjustments" to its current arrangement, Winward said.

'THAT SEEMED TOO LONG'

One key challenge was gaining approval from Air Force headquarters for the agreement, a process which took nine months. At that time, the Air Force had completed only a handful of IGSA's, and the waste services agreement would have been Dyess' first. Col. Kevin Johnson, commander of the 7th Mission Support Group, said in explaining the lengthy decision-making process.

"We had to go all the way to the Pentagon for approval," Johnson said. "That seemed too long for something that we as a base and city both agreed upon." (The Air Force has since given wing commanders authority to approve IGSA's below a certain dollar threshold.)

The Air Force approved Dyess' proposal in December 2017. Because the installation already was locked in to its fiscal 2018 waste management contract, officials decided to put off implementing the IGSA until Oct. 1, 2018.

"We're saving, over a five-year period, more than \$1 million of taxpayer money with the same level of service," Johnson said. "This is a fairly simple problem to tackle; it's not a major project, [there's] no major infrastructure investment. So it's not a difficult one to go after."

Beyond the direct financial savings the Air Force will secure under the arrangement, it will allow the installation's contracting staff to devote fewer resources to managing its waste collection requirements. Procurements conducted under the Federal Acquisition Regulation are significantly more arduous in term of the labor demands on contracting staff, Bonner said.

"It's just gotten so complex," he said. "This new way of doing things is better."

MORE TO COME

For Abilene and the Military Affairs Committee, the opportunity to save Dyess money was “a no brainer,” said Gray Bridwell, chairman of the committee. The community is always looking for new ways to make the installation more cost-effective and improve the capabilities of the 7th Bomb Wing, Bridwell said.



Mayor Anthony Williams, Col. David Doss of Dyess Air Force Base and Doug Peters president and CEO of the Abilene Chamber of Commerce sign their names to an agreement that provides local solid waste management services to the base.

“They’re using this as a springboard to do more for the military value and resiliency of the base,” Bonner said. “This is a good first step.”

In fact, the city was confronted with another opportunity to support Dyess two weeks before the new IGSA was scheduled to go into effect. At that point, the waste management contractor announced it would stop serving on-base family housing when the city assumed responsibility for the commercial side of the installation. The same contractor served the family housing under a separate agreement with Balfour Beatty Communities, which was not part of the discussions when Abilene and Dyess negotiated the IGSA.

With very little notice, the city juggled its staffing and maintenance schedule for its trucks and began serving 700 residential units at the same time it took over waste management services for the base proper, Winward said. And it reached an agreement with Balfour Beatty to serve on-base housing.

“This is a community that can get that done,” Bonner said. ■

MILITARY SPOUSE CAREER COALITION

Fort Carson & Colorado Springs, Colorado

Imagine you are the spouse of an active duty military member and recently moved to a new duty station. Again. The boxes are unpacked, the kids are somewhat settled, and you are ready to start work. After months of applications and interviews, you're still unemployed. The frustration is growing, and your family is struggling to make ends meet.

You are not alone.

UNEMPLOYMENT AND UNDEREMPLOYMENT AMONG MILITARY SPOUSES

While the nation enjoys historically low employment rates, the unemployment rate among military spouses is between 24 percent and 30 percent, according to various reports. Underemployment is also rampant at 56 percent, and many spouses who work part-time say they would rather be working full-time.

Military spouses face plenty of obstacles to finding employment, even though the

overwhelming majority have the same or higher levels of education, training and experience as their civilian counterparts. Employers may be reluctant to hire and train someone who has major gaps in their resumes, for example, or assume that military spouse candidates are likely to relocate after just two or three years. Some spouses find that their professional licensures from another state are not automatically accepted.

These hurdles are of concern not only to military spouses and their families but also to DoD leaders, who have noted the potentially negative effect on military retention and readiness and are increasing efforts to support military spouse employment.

One recent study showed that 93 percent of active duty members stay in the service if they have their spouses' backing; many whose spouses are unhappy choose to leave the service for the civilian sector.



Members of the Military Spouse Career Coalition attend a meeting on January 29, 2019.

THE MILITARY SPOUSE CAREER COALITION

Colorado Springs, Colo., is home to five major installations: Fort Carson, Peterson Air Force Base, the U.S. Air Force Academy, Schriever Air Force Base and Cheyenne Mountain Air Force Station.

In 2008, a small group of volunteers formed the Military Spouse Career Committee and launched a grassroots advocacy effort to increase employment opportunities for military spouses in the growing community.

In 2018 the group revised its mission and goals, invited more parties to the table, established bylaws and became an official committee under the Colorado Springs Chamber of Commerce's Military Affairs Committee. The name was changed to the Military Spouse Career Coalition (MSCC). Its mission is to empower military spouses in pursuit of meaningful careers, livable wages, and legislation and initiatives that minimize barriers.

Its vision is that Colorado Springs will be a model community in the state and across the country, with employers that actively recruit, hire and promote career-minded military spouses for competitive and gainful career opportunities with a genuine understanding and appreciation of the dynamics of the military lifestyle.

The MSCC is co-chaired by Katie Lally, special assistant to Mayor John Suthers, and Janet Farley, the MilSpouse Career Program manager at Mt. Carmel Veterans Service Center, a local nonprofit. Coalition members include representatives from the five installations, the Military Affairs Council, workforce agencies, local and national

nonprofits, higher education institutions, and elected officials or their representatives. Today more than 30 local and national organizations or elected officials are affiliated with the coalition.



Lindsay Teplesky, Deputy Director, Corporate Fellowship Program, Hiring Our Heroes, discusses next steps for an employee working group at the coalition's January 2019 meeting. Military Spouse Career Coalition image.

The coalition's emphasis on opening networking channels among its members has greatly increased collaboration between its members to better assist military spouses directly in identifying job opportunities and taking advantage of community resources.

For example, the spouse of an active duty Army officer deployed in Europe recently contacted Mayor Suthers' office requesting career support for his wife, who was living at Fort Carson. Lally promptly connected the jobseeker to Farley at Mt. Carmel, who was able to help her find a job. MSCC also connects professionally minded spouses with industry-appropriate mentors on a national and local level.

EDUCATION & ADVOCACY

The MSCC plans to take an active role in educating area employers about the skill level and strong work ethic that military spouses bring to the local workforce. Harnessing the strengths of its members, such as the Pikes Peak Workforce Center and Hiring Our Heroes, the MSCC has formed a special working group whose main task is to engage, educate and encourage employers to hire military spouses.

This initiative complements the U.S. Chamber's efforts in Colorado Springs to promote spouse employment. The Chamber designated the city as a Military Spouse Economic Employment Zone in May 2018, an effort that Lally says has energized the MSCC in its efforts.

The MSCC works closely with elected officials on legislation to level the playing field for military spouses in the state and in the nation.

One area of focus is professional licensure. Spouses who work in a career field that requires state licensure often find that requirements vary from state to state, making employment in their chosen careers difficult.

Recognizing the severity of this challenge for teachers in Colorado, the MSCC worked closely with state Rep. Terri Carver to pass a law exempting military spouses from having to acquire three consecutive years of teaching experience to be licensed in the state.

Carver has also helmed legislation to ensure veterans get credit for military training and experience toward civilian licensing requirements in the state.

"We were also fortunate to pass an interstate

compact last year on nurse licensing, helping our veterans and their spouses with nursing degrees to work in Colorado," Carver said. "I plan to sponsor legislation on interstate compacts covering speech pathology, audiology and counseling. We value the veteran and military families' expertise, resilience and skills—which are much needed and of value in our tight labor market here in Colorado."

The coalition helps the local media cover the issue. In one upcoming collaboration, members of the MSCC will partner with KRDO – the local ABC affiliate – the MilHousing Network – a military spouse owned business – Mt. Carmel Veterans Service Center and area employers to host the National MilSpouse Career Summit via Facebook Live.

'EVERYONE WINS'

"Our support and advocacy of military spouses benefit not only the spouses themselves but also the local community and the military," Farley said. "Many military families who are stationed in Colorado Springs end up staying here when they transition out of service. Or they come back here. Whether they are coming, going or staying, we are able assist spouses by connecting them with the best resources, advocate for them on the state and national level and contribute to growing the local workforce and economy. Everyone wins."

MSCC has been able to grow from very modest, ad hoc beginnings to a diverse, community-wide group of influential members that has developed substantial influence among and participation from the business and nonprofit sectors, military

leadership, the statehouse and the media.

“What we’ve done here is pretty replicable in any community,” Lally said. “If you want to identify and achieve a common set of goals, you just have to find everyone who has a little piece of the puzzle and bring them to the table.” ■



CONSOLIDATED EMERGENCY MANAGEMENT CENTER

Naval Submarine Base New London & the state of Connecticut

Naval Submarine Base New London, located in Groton, Conn., has long benefited from collaboration and commitments from the state and municipalities. What has become the “Submarine Capital of the World” had decidedly more humble beginnings: it was originally designed in the spring of 1868 to serve as a naval yard and storage depot.

However, the state and its southeastern cities and towns recognized the strategic location and economic potential of hosting a military installation and donated land along the Thames River to the Navy, leading to the construction of the Navy’s first submarine base.

Almost every submariner who serves in the Navy does a training tour at the base, which covers 680 acres and has more than 160 major facilities and 15 nuclear submarines. The base is also home to more than 70 tenant commands and activities, including the Naval Submarine School, the Naval Submarine Medical Research Laboratory and the Naval Undersea Medical Institute. Today, it serves

as the professional starting point for men and women in the Submarine Force.

A MORE MODERN COLLABORATION

This collaborative relationship has led to many mutually beneficial projects both inside and outside the fenceline. The state has invested more than \$14 million since 2009 to enhance the military value of the base. These investments included both on-base infrastructure and training facilities, and off-base encroachment mitigation projects. Construction projects include the state’s \$6.1 million investment in a microgrid that will allow the installation to switch from drawing electricity from the local utility grid during a power disruption and divert uninterrupted power to critical mission areas.

The base entered into a partnership with Connecticut and local utilities to install two 3.7-megawatt natural gas fuel cells on land leased from the Navy to generate clean



Navy Diver 3rd Class Cory McDowell, attached to the Los Angeles-class fast attack submarine USS San Juan (SSN 751), swims through the icy Thames River. McDowell is assigned to Naval Submarine Support Facility dive locker Subase, New London. U.S. Navy photo by John Narewski

energy for the microgrid. During normal operations, the Connecticut Municipal Electric Energy Cooperative will receive and distribute electricity from the fuel cells creating the necessary project revenue in a long-term power purchase agreement, making the project financially viable.

The state also paid for the construction of a \$4.65 million Navy Diver Support Facility for the base, used by divers assigned to the waterfront to conduct underwater maintenance on homeported submarines. Other state investments include a submarine bridge simulator, a culinary training center, and an energy efficient boiler.

WHEN A BASE GIVES BACK

Subase New London responded to this massive show of support by volunteering throughout the community. Each year, the base's executive officer holds a "Navy 101" information bootcamp during the Groton School District's teacher orientation session, explaining the Navy's deployment cycle, command structure, insider language and other facets of military life to new staff. This background helps teachers gain insight into how military families' lifestyles differ from those of their civilian counterparts and the unique challenges they face.

The Southeastern Connecticut's Military Superintendent Liaison Committee, a partnership between regional school districts and military installations in the region, brings together superintendents in all of southeastern Connecticut's eight school districts with leaders from area Navy, Coast Guard and National Guard installations, high school principals, community members and a

representative of the Military Child Education Coalition.

Sailors have also coordinated playground activities and assisted during assemblies and field days at schools, including a before-school physical fitness program, called "Wake Up with the Navy." Principal Jamie Giordano said interactions with service members teach students social and problem-solving skills and that they are "optimistic, positive—just wonderful role models."

OPENING THE GATE

Subase New London also conceptualized a project that would, with state and private investment, upgrade key infrastructure and dispose of archaic inefficient buildings on the base. Bob Ross, executive director of the state's Office of Military Affairs, describes it as a "gateway project that opens the way for more military value enhancing initiatives in the future."

In response to a request from the Connecticut Office of Military Affairs to identify a mission-enhancing construction project, leadership proposed the development of a consolidated emergency management center. The project would consolidate two firehouses, the base security department and associated equipment, demolish two excess buildings and repurpose two others. In addition to providing new, better working conditions for first responders and potentially improving emergency response times, the project would also enable the subase to relocate the main gate farther inside the fenceline to more fully comply with Navy physical security standards.

The state proposed forming a partnership

to cover the estimated \$28 million cost of the project. Through an existing bond authorization, Connecticut agreed to contribute \$13 million in the form of an offer of gift, and the Navy committed to providing \$5 million. Northeast Housing, LLC, a public-private partnership between the Navy and Balfour Beatty Communities (BBC), which owns, operates and manages all of the privatized housing on base, proposed a contribution of \$10 million. In return, BBC would benefit from the closing of a surplus firehouse off base, thus reducing its operating expense by \$1.25 million per year.



The Virginia-class attack submarine Pre-Commissioning Unit (PCU) North Dakota (SSN 784) is rolled out of an indoor shipyard facility at General Dynamics Electric Boat in Groton, Conn. Navy photo courtesy of General Dynamics.

One particularly innovative component of the project is to remodel the surplus, off-base firehouse to serve as a Navy Community Workspace and Conference Center, featuring large meeting spaces and shared, leasable workspaces. The facility is conveniently located at a commercial intersection near the base, which, in addition to earning rent from businesses and other organizations that work with the Navy, could also be used by community support organizations to hold large meetings and other activities.

Its off-base location avoids the need to enforce onerous security procedures that

would be imposed were the facility located within the fenceline. The proposed facility could be managed by the Morale, Welfare and Recreation Department or a private firm and produce the revenue necessary to make it financially self-sustaining.

"In Connecticut, we have had years of unrelenting support from our governors, congressional delegation, state legislature, municipal leaders and public school systems for our service members, their families and military bases," Ross said. "Great defense community relations isn't about one thing. It's about everything that enhances quality of life and service here." ■

ENHANCING INSTALLATION RESILIENCY, PROMOTING COMPATIBLE DEVELOPMENT, AND PROTECTING THE WATER SUPPLY

Naval Weapons Station Earle, Monmouth County & the state of New Jersey

Naval Weapons Station (NWS) Earle, the ammunition depot in Monmouth County, N.J., has been receiving, storing and providing ammunition for the Navy, Marines, Coast Guard and foreign commercial vessels since World War II. The largest weapon station on the East Coast, it supplied most of the ammunition for the Normandy invasion and 90 percent of that used during Operation Desert Storm. Its extensive storage, transport and offshore loading facilities allow the station to serve as the primary ammunition loading point for the Atlantic Fleet.

“The main value of the base is not its facilities but its large explosive loading capability and ship turnaround time,” said Dennis Blazak, NWS Earle’s community plans and liaison officer.

The base encompasses 11,851 acres within five municipalities. It is a busy and complex installation but carries out its mission so seamlessly, effectively and safely that its

activities are essentially a secret hiding in plain sight.

“We found out from talking to local residents that, because Earle is quiet and 75 years old, many of them didn’t know what was actually going on behind the fence,” said Linda Brennen, supervisor of environmental and sustainability planning for the Monmouth County Division of Planning.

As a result, some municipalities did not know certain forms of civilian development too close to the installation could severely hamper the base’s activities and, therefore, its mission.

DEVELOPMENT ON ITS WAY

A joint land use study (JLUS) the county completed in 2017 identified several areas of potential encroachment, including forested areas near the base. Development



The Naval Weapons Station Earle Pier Complex supplies the Carrier and Expeditionary Strike Groups in the Atlantic. The three-mile-long pier allows ammunition trains to quickly and safely load USNS auxiliary ships supplying the Fleet. Navy photo by Naval Weapons Station Earle.

within the Military Influence Area (MIA) is made more likely by state affordable housing requirements, the high quality of life, and proximity to New York City. Such development could seriously compromise the base's mission.

"Many areas of the base perimeter are protected by the presence of wetlands or open space that are slated for public use, but higher-density residential development near some parts of the base could put people at risk if a truly catastrophic explosion—one that sends ordnance or debris beyond explosive safety arcs the base has established—were to occur," Blazak said.

Such concerns also extend to the marine security zone on the waterfront area, near which high-speed ferries carry up to 500 people between Monmouth County and Manhattan.

Preserving nearby farms and natural areas from development will lead to a safer community in and around the MIA. About 90 percent of the base is used for the ammunition storage, and all DoD explosive safety setback requirements are met, but some land uses near the ordnance magazines, like high-density residential developments, may be less compatible with the military mission than lower-density land uses.

ACQUIRING THE SPACE

To address these and other encroachment issues, the base relied on information from the JLUS and the installation's 2014 encroachment action plan, and partnered with the county to take advantage of county

and state land preservation campaigns, acquiring 2,000 acres of vulnerable property within the priority acquisition areas.

These acquisitions will also allow the base to target land outside the MIA in three area watersheds, including that of the Swimming River Reservoir, which provides Earle's water supply. The state of New Jersey has placed restrictions on groundwater usage to prevent saltwater intrusion into the watersheds, which makes it especially important for the base to preserve recharge areas and protect the surface water that flows into them. Furthermore, protecting the Raritan Bayshore area from nuisance flooding, improving stormwater management and post-storm resilience will protect access to Earle's waterfront complex.

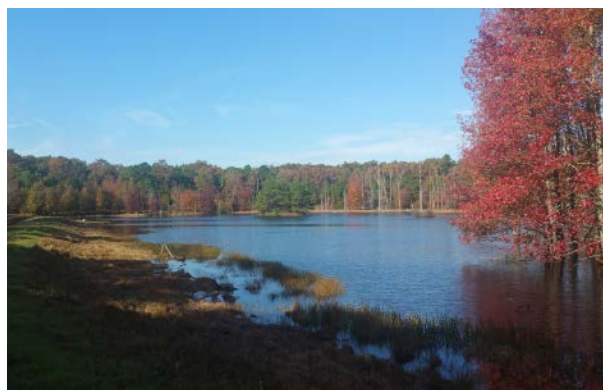
The Navy and Monmouth County negotiated a five-year land purchase agreement in September 2018 for resource protection. During the first year, DoD's Readiness and Environmental Protection Integration (REPI) program contributed \$765,000 toward the project's first acquisitions of targeted properties within the MIA or inside the Swimming River Reservoir watershed. The funds will be matched by other state and county sources, and the county will pay all transaction costs.

The cost for acquiring all 2,000 acres, for which the Navy will obtain restrictive easements but not take ownership, will come to about \$10 million, half of which will be requested from the REPI program.

PROTECTION FOR NATURAL RESOURCES

The land acquisition will encourage natural resource management — including habitat restoration — reduce sedimentation and storm water runoff, and protect the water supply watersheds; the installation used 45 million gallons of potable water in 2018. It also could decrease Naval dredging costs.

Development or degradation of land near streams, coastal lakes or near marshes could lower storm water capacity and resilience from storms, and continued development in the Raritan-Sandy Hook Bayshore will increase sedimentation and the threat to the base's mission caused by extreme weather events and rising sea levels, which planners expect to worsen in the years and decades to come.



A manmade wetlands area at Naval Weapons Station Earle recharges groundwater while slowing down peak water flows during heavy rainstorms. Green infrastructure projects like this are planned for preserved lands with DoD funds through REPI in the watersheds of three nearby reservoirs in Central New Jersey.

"We're looking at how to address storm resilience issues that could affect key transport routes that connect ports of embarkation, like NWS Earle, to major manufacturing plants throughout the country," Blazak said. "This includes trying

to anticipate storm surge and other impacts from hurricanes and other extreme weather events that might wash out a main road or cause structural damage from now until 2100."

The station has already withstood significant—and costly—damage from extreme weather events. Hurricane Sandy caused \$50 million in damage to NWS Earle, primarily to the pier complex. Permanent repairs to utilities took more than two and a half years to complete. A warehouse building 100 feet from shore that was damaged by waves was rebuilt 1,000 feet inland and on higher ground for \$3.2 million.

"That project is a good example of employing retreat as a climate adaptation tactic," Blazak said.

Brennen said they are also kicking off a coastal resilience planning study.

"We're trying to identify sites that could be candidates for projects such as enhancing existing wetlands that would tie into existing floodgates and walls that the U.S. Army Corps of Engineers is working on," she said.

"Another piece of the REPI focuses on farmland preservation," Brennen added. "We would like to use REPI funding to help purchase the development rights for interested farms that are nearby."

Finally, because the EPA no longer permits dredged material to be dumped offshore, the Navy must find a beneficial use for it. The base is looking into using it for beach replenishment and berm creation to protect Navy base and storm evacuation routes for both military personnel and civilians. Dredging is conducted on an approximately

five-year cycle; NWS Earle is about three years away from the next round. The last 750,000 cubic yard dredging project cost about \$18 million, but future rounds may cost more due to changing environmental permit requirements, Blazak said.

“Wetlands near the pier or along the bayshore could be drowned by sea level rise over the next decades,” Brennen said.

“Matching suitable areas with dredge material from the Navy channel could be a boon to the base and the surrounding community through thin-layer deposition to raise existing wetland elevations.”

Various county and state organizations provide funding or hold deeds of easement to support land preservation projects near NWS Earle. For example, the Monmouth County Park System, local municipalities and the New Jersey Department of Environmental Protection Green Acres Program oversee the acquisition and management of parks and other open spaces. The Monmouth County Agriculture Development Board and the New Jersey State Agriculture Development Committee fund farmland preservation efforts. And the Monmouth Conservation Foundation works with the county and municipalities on preservation projects and conducts outreach to property owners near the base.

This REPI project with the state and county is designed to ensure NWS Earle’s mission while protecting people and assets beyond the fenceline by preventing an increase in residential density near the base, buffering streams, protecting source water and habitat for threatened species, and decreasing the harmful effects of weather events and erosion. It may also support the Navy’s

maintenance dredging projects to ensure water channels are kept clear and can accommodate its fleet ammunition loading operations.

“This opportunity to work with the Navy and DoD on a project that allows us to do things that we couldn’t do alone has been a wonderful experience,” Brennen said. ■



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