

Mining Services



MWH® now
part of



Stantec

MWH, now part of Stantec, facilitates and helps enable clients in meeting social, environmental, and business obligations through our expertise in water, focus on stakeholder value, and commitment to safety, quality, and sustainability.

We're active members of the communities we serve. That's why at MWH, now part of Stantec, we always design with community in mind. Our community unites approximately 22,000 employees in over 400 locations across six continents. Our work as architects, engineers, and consultants from initial project concept and planning through design, construction, and commissioning begins at the intersection of community, creativity, and client relationships.

Our local knowledge and relationships, coupled with our global expertise, qualify us to go anywhere to solve clients' challenges in creative and personalized ways. Visit us at mwhglobal.com and stantec.com, or find us on social media.

As a leading mining consulting firm, we bring valuable experience and innovative solutions that support our mining clients **across the life-cycle of the project.**

Mine Planning & Permitting

We are a recognized leader in environmental impact studies, permitting, compliance, and management services. Based on our thorough and up-to-date understanding of all relevant regulations and mining practices, in all of the regions we serve, we provide our clients with clear, concise, and defensible work products that result in permits to operate. We support clients from conceptual or scoping studies through feasibility and detailed engineering. Our diverse project experience varies from dry sites to tropical and humid environments. This experience, combined with technical expertise across all required scientific and engineering disciplines, allows us to provide realistic projections with regard to feasibility, environmental impact, and operational costs.

Operational Services and Support

We provide prompt and streamlined responses in support of our clients' operational decision-making and evaluations, allowing them to optimize the use of water and energy, plan for assets, and limit liabilities through long-term planning. Our professionals have many years of experience managing water, tailings, and mine waste throughout the entire mine life cycle.

Reclamation and Closure

Our mining clients benefit from more than 30 years of expertise in the reclamation and closure of mine sites and mineral processing facilities. We work with clients to begin closure planning at the start of the mine life-cycle to design sustainable solutions throughout the project. We have completed large, and small high-profile

reclamation projects at multiple sites around the world. We take pride in designing innovative solutions which incorporate value-engineering options, minimize overall costs, and provide for sustainable post-mining land uses and landform stability. We work with our clients to identify and manage environmental issues that influence closure designs, and we maintain a thorough and current understanding of host country legislation, and international laws that regulate mine reclamation and closure.

Safety

We have safely delivered consulting and construction management services to our mining clients for many years. We exercise the "Zero Harm" and "Safe by Design" approaches to our projects. We have developed mature and effective risk

assessment and risk management systems that are integrated into all phases of our project work. We employ dedicated health and safety professionals, and we make ongoing investments in the safety of our personnel through mandatory training and education. These deliberate risk management efforts reduce liability risk to our clients and improve project performance.

Social Services and Stakeholder Consultation

Our local staff are knowledgeable of the socio- economic and cultural issues that surround mining projects. As citizens of these mining communities, our employees understand the issues and work closely with mining clients to engage with stakeholders and incorporate community needs into technical solutions

We provide **technical expertise and focused solutions** to a variety of complex mining challenges around the world.

Geotechnical Engineering

We provide technically-sound and cost-effective geotechnical and civil designs to our mining clients. We are globally recognized and trusted for our ability to plan, permit, design, and construct world-class geotechnical and civil projects in some of the most complex settings in the world. We have designed a broad variety of durable structures that perform well for over many years including large tailings dams, leach pads, waste piles, water storage impoundments, roads, bridges, and mine buildings. We routinely provide dedicated field engineers and quality assurance technicians for the duration of a project, from initial geotechnical investigations and completion of final design documents, to field construction and monitoring.

Tailing and Mine Waste Management

We provide our mining clients with industry-leading expertise in the field of tailing and mine waste management. Many of our technical professionals are leaders in the field and routinely lead seminars and publish technical papers and peer-reviewed journal articles. Our clients benefit from experience that covers multiple sites in a broad variety of geologic and climatic settings. We have completed projects around the world at high altitudes, in remote locations, arctic conditions, arid deserts, and rain forests. We help our clients minimize waste volumes through the latest innovative technologies, including alternative tailing disposal options. Our technical expertise, along with our hands-on experience, is used at mine sites around the world to design and construct tailings and mine waste facilities that have proven to be physically stable and environmentally sound.

Ecological Services and Natural Resource Management

We offer comprehensive ecological and natural resource management services to support mining operations. We employ a multi-disciplinary approach to environmental issues in a wide range of ecological habitats including riverine and riparian corridors, wetlands, woodlands, shrublands, grasslands and desert ecosystems. Our services include baseline studies, ecological monitoring and management, revegetation design, wetlands delineation and management, and ecological risk assessments, among many others. Our diverse capabilities allow us to provide clients with innovative, cost-effective, and sustainable solutions to ecological challenges.

Contaminated Site Remediation

We offer world-class expertise in contaminated site clean-up for our mining industry clients. We offer a full spectrum of capabilities to effectively remediate surface and subsurface contamination in the most practical manner possible. We are experienced with virtually all of the proven and developing remediation technologies, and we have completed numerous site investigations, risk assessments, remedial design and remediation projects for contaminated lands around the world.

Project Management

We support our mining clients with sound project management practices. Our project managers are committed to sound fiscal management, adhering to schedule commitments, and high safety standards. We work hard to understand our clients’ goals, objectives, and internal business drivers. We have developed a mature and effective program for the training of our project managers, and we utilize superior quality assurance processes to continually refine our management practices to increase the quality of our services and project deliverables. This powerful alchemy drives understanding of internal client business drivers allowing for exceptional project execution, solutions that are fit for purpose, and on budget.

We are a **global leader** in **integrated water management.**

Mine Water Management

We bring proven expertise in the area of water supply and mine water management. We understand the diverse needs of our mining clients and provide them with proven solutions to their water supply, storage, transmission, disposal, and management challenges. We provide water shed and aquifer evaluations, water balance prediction models, water management and treatment plans, and drainage control, while considering both current and future requirements and processes. In addition, our teams take an integrated approach to water management that considers all aspects of water use at a mine. When needed we go beyond the mine to consider water use within the entire water shed. Whether our client is dealing with a water deficit or surplus, our water management team will support the mine to manage their water resources and make sound planning and operational decisions.

Water Treatment

We provide industry-leading water treatment expertise to our mining and industrial clients, helping them solve complex problems. We are experts in a wide-range of treatment technologies, including adaptive systems which can

address changing treatment requirements throughout the mine life-cycle, and systems which reuse or recycle the water in the treatment process. Because we are vendor neutral, we offer an unbiased approach to determining which processes and technologies are most effective for a given project, and then work with the appropriate vendors on behalf of our client. Having worked at mines around the world, we have experience using multiple wastewater treatment methods including active, passive, conventional, advanced, and biological approaches. Our treatment approaches improve efficiency while protecting the environment and minimizing risk.

Hydrogeology and Geochemistry

We help clients understand the balance of resources at an operation allowing for smart financial decisions. Our global experience assists clients with permitting, development, operation, and closure. Our expertise includes evaluating groundwater resources, performing modeling with finite-element, finite-difference, and analytical codes for groundwater flow, and geochemical and contaminant fate and transport applications.



We are home to industry leading experts in the design and management of mining projects



Mina Cerro Corona

The Cerro Corona mine is located in the district and province of Hualgayoc, Cajamarca Region. Situated in the Andes, in northern Peru, the mine has an elevation of 3,600 masl to 4,060 masl. Water quality has been characterized in various studies conducted in 1996, 2001, 2002, and 2004.

The Project includes the design and the construction QA/QC of a tailings dam for the Cerro Corona copper concentrator, as well as the engineering management, procurement, and construction. The mine will be developed to extract sulfide and oxide ores using conventional open air mining methods, including drilling and hauling, to achieve an annual production rate of about 6.2 million tons.



Minera Los Pelambres

The El Mauro Tailings Storage Facility is owned by Minera Los Pelambres, and is located in the Fourth Region of Chile, approximately 350 km north of the city of Santiago.

Minera Los Pelambres requested us to develop the detailed engineering design of El Mauro tailings TSF operational weir Stage III that is part of the flood evacuation system and will provide operational continuity of the TSF between elevations 885,7 masl and 933,1 masl.

Minera Los Pelambres has an ore treatment capacity of 175,000 tons per day and the El Mauro TSF has a storage capacity of 1700 million tons. The El Mauro TSF is located in the Coquimbo region, approximately 50 km east of Los Vilos.

The design corresponds to a variable crest weir, which is raised with slabs as the tailings level in the TSF rises. It consists of an inclined intake tower that is connected at its base to a stilling chamber. The stilling chamber, in turn, continues through two connection tunnels and a vertical shaft until joining the existing evacuation tunnel that finally discharges downstream the TSF embankment.



Gill Mine

We provided a pre-feasibility study (PFS) hydrological assessments for a large-scale mine expansion near Fairbanks, Alaska. Deliverables involved definition of baseline characteristics of surface and groundwater resources over an area which includes north facing wetlands, surface-water drainages that flow during the spring breakup, and two larger tributaries. We implemented surface-water monitoring stations in the drainages to characterize chemistry, temperature and flow rates to establish baseline data. The remote monitoring stations, accessed primarily on ATVs, are carefully engineered as most of the stations are covered with at least 10 feet of sheet ice for eight months of the year. Groundwater characterization was performed through the footprint of the potential mine plan to evaluate flow directions, depth, formation permeability, recharge and discharge zones and geochemistry. Permafrost reaching depth of 150 feet along the north facing slopes complicates the groundwater flow and plays an important part in future pit dewatering strategies. The subzero temperatures combined with the remote site takes careful planning by our hydrogeologists to maintain site safety, supplies and equipment. The project supports client efforts to permit the project for a full-scale mining operation that will be over six square miles.



Midnite Mine

In 2011, we were contracted with Newmont Mining Company to prepare the remedial design (RD) for the Midnite Mine CERCLA site, located on the Spokane Indian reservation in eastern Washington. The site is an inactive open-pit uranium mine that was operated from the 1960s through the early 1980s. Primary RD elements include consolidation of mined materials (approximately 18 million cubic yards) in the two remaining open pits, incorporating subsurface affected water collection systems, and capping the consolidated materials with a soil and geomembrane cover for isolation and reduction of infiltration. Water management elements of the RD include collection, on-site treatment, and permitted discharge of affected mine water. During the planned construction period, storage of mine water prior to treatment transitions from one of the open pits to a geomembrane-lined pond, and the discharge point for treated water changes from the site area to Lake Roosevelt (through a 7-mile long buried pipeline). Surface water management during construction is being planned according to applicable EPA and eastern Washington guidelines. The project is progressing through the review process with the US EPA and technical representatives of the Spokane Tribe of Indians, and is scheduled to reach the 90% design stage later in 2014.



Browns Range Heavy Rare Earth Elements (HREE) Project

The proposed project is located in the remote south-eastern Kimberley region of Western Australia, approximately 750 km southeast of Darwin and involves both open pit and underground mining of several deposits as well as supporting infrastructure. Since 2012, we have provided environmental services to assist in the approvals process including advice, coordination of extensive baseline surveys and impact assessments for flora, terrestrial vertebrate fauna, short-range endemic invertebrate fauna, and subterranean fauna, and liaison with various regulatory authorities. Additionally, we provided baseline soil assessments and mine waste materials characterizations that would later contribute significantly to waste landform designs, and remediation and rehabilitation considerations. Throughout the course of the Project, we developed and maintained a close working relationship with the client and are committed to continuing this relationship beyond the approvals process of the Browns Range HREE project.



Cockatoo Island Mine

Our ecology and environment division was engaged to review and update the Progressive Closure Plan (PCP) for the Cockatoo Island Mine Site. Cockatoo Island is located in the pristine ecology of the Buccaneer archipelago in the West Kimberley, W. Australia. The project is unique in that opencast mining of the high grade iron ore deposit occurs below the sea level, via staged seawall construction. Working collaboratively with Pluton to update the PCP closure strategies the project encompasses a series of domains including: Landforms, Littoral Zone Landforms and Infrastructure, Industrial Infrastructure, Exploration and Roads. The former PCP was upgraded and operationalized using our Progressive Rehabilitation and Closure (PRAC®) System. The cloud based system benefits the client by moving from static, paper based plans, into a fully operational closure planning system.



The MWH community, now part of Stantec, unites approximately 22,000 employees in over 400 locations across six continents. From initial concept and planning through design, construction, and commissioning, our work begins at the intersection of community, creativity, and client relationships. Visit mwhglobal.com and stantec.com, or find us on social media.



We provide responsive service and expertise from offices around the globe:

North America, Latin America, Europe, Africa, India, the Middle East, Asia and the Pacific



MWH®

now
part of



Stantec

www.mwhglobal.com | www.stantec.com
[Facebook.com/mwhglobal](https://www.facebook.com/mwhglobal)
[Twitter.com/mwhglobal](https://twitter.com/mwhglobal)
[YouTube.com/mwhglobalinc](https://www.youtube.com/mwhglobalinc)
[Linkedin.com/company/mwhglobal](https://www.linkedin.com/company/mwhglobal)