



Jared Purdy, P.E.

Mining / Geotechnical Engineer

Education

MS, Mining and Earth Systems Engineering, Colorado School of Mines, 2003

BS, Civil Engineering, Colorado School of Mines, 2000

Registrations/Certifications

Professional Engineer, Colorado (#38517, 2004), Utah (#6223171-2202, 2006), Nevada (#20570, 2010), California (#C 85959, 2016)

Experience Summary

Mr. Purdy has 18 years of professional experience in mining geotechnics, geotechnical investigations, foundation design, and construction management projects in the United States and Latin America. Specialties include geotechnical investigations; slope stability; mechanically stabilized earth walls/slopes; seepage, tailings storage facility (TSF) design, operation, closure, and stewardship; and the identification and mitigation of geotechnical and geologic hazards.

Project Experience

Mine Tailings / Waste Facilities

MINA EL LIMÓN | EL LIMÓN, NICARAGUA

Project Manager for the field exploration, design, and construction of a tailings dam raise to an existing embankment (Santa Rosa TSF). Designed the raise of the Santa Rosa dam using a reinforced earth wall for the crest raise – the first application of geosynthetics for dam raising currently known.

Project Manager and Lead Engineer for a new geosynthetic-lined TSF (San José TSF). Managed geotechnical field investigation programs. Supervised construction and performed field engineering as needed.

Project Manager and Lead Engineer for all geotechnical/civil projects associated with TSF, TSF monitoring, and TSF inspections. Provide operational support to ensure TSF is operated safely, efficiently, and effectively. (Vector Colorado, 2003 to 2005; Tetra Tech, 2009 to 2012; Tierra Group, 2012 to Present)

MINA EL MOCHITO | LAS VEGAS, HONDURAS

Aided in the design and modeling of an upstream raise of a tailings embankment. Work included a seismic hazard assessment, liquefaction modeling, seepage modeling, and static and pseudo-static slope stability analyses. Designed a toe berm for an existing tailings embankment (Pozo Azul TSF).

Aided in the siting and preliminary design of a future tailings impoundment (Soledad TSF). Project Manager and Lead Engineer for the Stage 2, 3, and 4 raises of the Soledad TSF, including a unique method for lining of near vertical limestone slopes with geosynthetics. Supervises TSF construction QA and provides field engineering as required.

Project Manager and Lead Design Engineer for the closure engineering for the Pozo Azul and El Bosque TSFs.

Project manager for the initial site investigation and preliminary design of a new TSF (Douglas TSF).

Conducts annual inspections of three tailings embankments and storage facilities. Provides consulting for all geotechnical site issues ranging from slope stability for landslide to erosion and surface water management.

Project Manager and Lead Engineer for all geotechnical/civil projects associated with TSF, TSF monitoring, and TSF inspections since 2008. Provide operational support to ensure TSF is operated safely, efficiently,

and effectively. (Olsson Associates, 2002 to 2003; Vector Colorado, 2003 to 2005; Tetra Tech, 2008 to 2012; Tierra Group, 2012 to Present)

MINA LA LIBERTAD | LA LIBERTAD, NICARAGUA

Project Manager and Lead Engineer for the design and construction of the downstream-raised, geosynthetic-lined La Esperanza TSF. Project Manager and Lead Engineer for the expansion of the La Esperanza TSF utilizing a mechanically stabilized earth (MSE) wall to raise the dam crest vertically to maintain the facility within property boundaries and reduce construction time and costs. Supervises TSF construction QA and provides field engineering as required.

Developed and managed a preliminary field investigation and completed an alternatives analysis/site trade-off study to identify a new, conventional TSF. Supervised a geotechnical/hydrogeological investigation and managed the conceptual engineering for a TSF within an expended open pit.

Project Manager and Lead Engineer for all geotechnical/civil projects associated with TSF, TSF monitoring, and TSF inspections. Provide operational support to ensure TSF is operated safely, efficiently, and effectively. (Tetra Tech, 2008 to 2012; Tierra Group, 2012 to Present)

GOLDCORP INC. CORPORATE TAILINGS STEWARDSHIP STRATEGY | LATIN AMERICA

Tailings Steward for all of Goldcorp's TSF in located in Latin American, which include Peñasquito and Los Filos (Mexico), Marlin (Guatemala), and Cerro Negro (Argentina) mines. Tailings Stewardship required independently evaluating the design, operations and safety of all tailings and water dams, which included performing hazards classifications, facilitated risk assessments, systems and processes reviews, operations team training, Dam Safety Inspections and preparing a 5-year Dam Safety Review Report consistent with Canadian Dam Association guidelines. This multi-year role requires that updates be prepared annually. (Tierra Group, 2015 to Present)

MCLAUGHLIN MINE, HOMESTAKE MINING COMPANY | LOWER LAKE, CALIFORNIA

Engineer of Record for the McLaughlin Mine tailings facility. Responsible for facility engineering, monitoring, and inspections. Project Manager and Lead Engineer for various surface water and groundwater control projects for the mine waste rock disposal facilities. (Tierra Group, 2016 to Present)

ARANAZÚ | ZACATECAS STATE, MÉXICO

Project Manager and Lead Engineer for the geotechnical field investigation and final engineering design of a new TSF (TD5). Provided third-party engineering design review for the expansion/raise of the existing TD4 tailings facility. (Tierra Group, 2014 to Present)

MINA EL AGUILA | OAXACA STATE, MÉXICO

Managed field construction quality assurance and provided engineering oversight during the construction of the Phase 3 TSF. (Tierra Group, 2014 to 2016)

PITARRILLA | DURANGO STATE, MÉXICO

Developed and managed geotechnical field investigation and laboratory testing program to support a definitive feasibility study for a 112-million-tonne TSF. (Tierra Group, 2012)

MINA EL CUBO | GUANAJUATO, MÉXICO

Performed a geotechnical audit of a series of tailings impoundments to evaluate compliance with Mexican mining regulations. Work included seepage, stability, and liquefaction analyses as well as a site-specific seismic hazard analysis. Provided recommendations for operations and construction to comply with Mexican regulations and industry standards of practice. (Tetra Tech, 2010 to 2011)

Provided tailings operations support and tailing cyclone design review. (Tierra Group, 2016)

MINA EL DORADO | SENSUNTEPEQUE, EL SALVADOR

Performed geotechnical investigations for the siting and design of a new tailings impoundment. Investigations included geotechnical drilling, wireline drilling, in-situ permeability testing, test pitting to locate potential borrow materials, and geological field mapping of the impoundment basin. Project Manager and Lead Engineer for the final design of the tailings facility. (Vector Colorado, 2004 to 2005; Tetra Tech, 2008 to 2009)

KENNECOTT, RIO TINTO | MAGNA, UTAH

Performed an independent audit of the liquefaction potential of the southeast portion of the tailings impoundment adjacent to the city of Magna, UT. (Tetra Tech, 2009)

KEY LAKE, CAMECO | SASKATCHEWAN, CANADA

Performed static and dynamic liquefaction analysis of slopes of the Deilmann Tailings Management Facility. (Tetra Tech, 2010)

TAILINGS IMPOUNDMENT MODELING, BARRICK GOLDSTRIKE MINE | CARLIN, NEVADA

Performed cone penetration testing (CPT) on the AA Tailings Impoundment, reduced data collected from the field investigation, and performed a suite of geotechnical modeling. The modeling included modeling of the tailings mass to determine the feasibility of placing a low-grade ore stockpile on the surface of the tailings impoundment. Modeling included determining the present flow regime of the tailings impoundment, transient flow modeling of the impoundment, consolidation and pore pressure generation resulting from the application of a potential stockpile, flow and cyclic liquefaction modeling, and static and pseudo-static slope stability. (Olsson Associates, 2002 to 2003; Vector Colorado, LLC, 2003 to 2005)

STORAGE CAPACITY / IMPOUNDMENT CONSOLIDATION FEASIBILITY STUDY | COLORADO

Performed CPT investigation on silt pond to determine the feasibility of consolidating the impoundment and increasing storage capacity. Data collected during the field investigation was reduced to provide material properties used in liquefaction, seepage, and consolidation modeling. Additional services to the client included feasibility designs for slurry cut-off walls and reservoir embankments. Provided geotechnical drilling supervision, in-situ permeability testing, and core logging at numerous sites along the Colorado Front Range. (Olsson Associates, 2002 to 2003; Vector Colorado, 2003 to 2004)

HOMESTAKE MINE SOIL AND CONCRETE SAMPLING | LEAD, SOUTH DAKOTA

Logging and sampling of soil and concrete using a truck-mounted Geo-Probe and a dolly-mounted core drill, respectively. (SRK Consulting, 2001)

PUEBLO VIEJO | DOMINICAN REPUBLIC

Designed three RCC faced dams; Arroyo San Juan, Arroyo Candido, and the 25-m Margajita. The Candido and the 25-m Margajita Dam were designed to capture and retain ARD. Determined construction quantities for each dam using AutoCAD software. (SRK Consulting, 2001)

GORO NICKEL PROJECT | NEW CALEDONIA

Provided design support for the feasibility design of a nickel laterite mine. Duties included reduction of geotechnical field data, civil design, and geotechnical modeling for several dams. Performed extensive static and pseudo-static slope stability analyses on all stages of each dam. Work also included translation of documents from French to English and English to French. (SRK Consulting, 2000 to 2001)

ATLAS URANIUM MILL SITE | MOAB, UTAH

Compiled spreadsheet to summarize geotechnical testing data spanning more than 25 years and thousands of pages from various reports. Prepared digital borehole logs for report presentation using WINLOG. Calculated soil characteristics from field data and CPT testing. Determined both 'in-pile' and groundwater gradients from field data, bore logs, and CPT testing. Performed settlement calculations for the tailings pile under its design cover. Designed a dewatering program using vertical wick drains to achieve 90% consolidation in 18 months. Provided construction oversight for the installation of vertical wicks and continued in-field engineering of the dewatering design. Prepared as-built documents following completion of work. (SRK Consulting, 2000 to 2001; Olsson Associates, 2002)

PASCUA LAMA PROJECT DAM LAYOUT DESIGN | CHILE-ARGENTINA

Designed dam layout to maximize storage and minimize cost. Performed extensive static and pseudo-static slope stability analyses for each stage of the dam and the surrounding slopes. Developed drawings and sections using AutoCAD. (SRK Consulting, 2000 to 2001)

SILT POND EMBANKMENT FAILURE ANALYSIS | HENDERSON, COLORADO

Responsible for the back analysis and evaluation of cause of a silt pond embankment failure. (Olsson Associates, 2002 to 2003)

Heap Leach Facilities

BELLAVISTA | MIRAMAR, COSTA RICA

Project Manager for the installation of geotechnical instrumentation to monitor movement of an active landslide that underlies the heap leach facilities and waste rock stockpile. Provided interpretation of monitoring data and recommendations for landslide mitigation. (Tetra Tech, 2008 to 2010)

HEAP LEACH FACILITY GEOTECHNICAL MODELING AND PRELIMINARY DESIGN | SAFFORD, ARIZONA

Aided in the preliminary design and geotechnical modeling of a heap leach facility. Modeling included static and dynamic slope stability. (Vector Colorado, 2003 to 2004)

SOUTHERN PERÚ COPPER CORPORATION | PERÚ

Aided in the design of leach pad staging and layout. Calculated quantities using CAD software. Developed drawings and sections using AutoCAD. (SRK Consulting, 2000 to 2001)

Dams / Reservoirs / Levees

MCLAUGHLIN MINE, HOMESTAKE MINING COMPANY | LOWER LAKE, CALIFORNIA

Engineer of Record for the McLaughlin Mine Davis Creek Reservoir. Responsible for facility engineering, monitoring, and inspections. (Tierra Group, 2016 to Present)

LA ESTANCIA RESIDENTIAL SUBDIVISION | KANAB, UTAH

Performed a geotechnical site investigation and provided geotechnical recommendations for the design of a stormwater retention basin/embankment. (AGEC, 2006 to 2007)

EARTHFILL EMBANKMENT INVESTIGATION, SARGENT IRRIGATION DISTRICT | MILBURN, NEBRASKA

Oversaw geotechnical drilling and in-situ testing of an active earthfill embankment dam. Data collected was used to determine the stability of the dam under present operating conditions as well conditions potentially active during the partial excavation of the embankment for the construction of a new spillway. In addition, engineering support was provided in the design and evaluation of cantilever and tied-back walls acting as both soil retaining structures and bridge abutments/supports. (Olsson Associates, 2002 to 2003)

Geologic Studies / Hazard Investigations

ROCKFALL HAZARDS MODELING FOR RESIDENTIAL SUBDIVISION | ST. GEORGE, UTAH

Identified and modeled potential rockfall hazards for a master planned residential subdivision. (AGEC, 2007)

AVALANCHE POTENTIAL MODELING | ASPEN, COLORADO

Identified and modeled potential snow avalanches and determined the impact pressures resulting from the design avalanche on existing structures. (Vector Colorado, 2003 to 2004)

AVALANCHE AND ROCKFALL HAZARD INVESTIGATION | CRESTED BUTTE, COLORADO

Identified and modeled potential snow avalanches and rockfall hazards for Parcels 7 and 8 of the Skyland Development. Differing hazard levels were delineated and locations where hazards intercepted planned developments were identified. Developed designs for feasible mitigation measures. (Vector Colorado, 2002 to 2004)

Site Investigations

VALLEY VIEW MEDICAL CENTER | CEDAR CITY, UTAH

Performed geotechnical site investigation work and provided foundation recommendations for the design of a radiology wing addition. Work included foundation underpinning and shoring in order to construct a basement addition adjacent to the operating radiology wing. (AGEC, 2006 to 2008)

SOUTH MOUNTAIN VILLAGE GEOTECHNICAL SITE INVESTIGATION | WASHINGTON, UTAH

Performed geotechnical site investigation work and provided foundation recommendations for the design of a master-planned community on property underlain by highly collapsible soils and expansive bedrock. Work included subgrade preparation through pre-wetting operations, supplementary subsurface investigation, and intensive laboratory testing. (AGEC, 2006 to 2008)

LA ESTANCIA RESIDENTIAL DEVELOPMENT | KANAB, UTAH

Performed geotechnical site investigation work and provided foundation recommendations for the design of single-family and multi-family residences to be constructed in areas of expansive bedrock and collapsible soils. (AGEC, 2005 to 2007)

THE CLIFFS OF SNOW CANYON GEOTECHNICAL SITE INVESTIGATION | ST. GEORGE, UTAH

Performed geotechnical site investigation work and provided foundation recommendations for the design of single-family residences. Designed boulder-faced slopes and MSE walls to facilitate construction of residences on steep slopes. (AGEC, 2005 to 2007)

THE LEDGES OF SAINT GEORGE | ST. GEORGE, UTAH

Performed geotechnical site investigation work and provided foundation recommendations for the design of a large, master planned golf course community. (AGEC, 2005 to 2008)

HALL COUNTY AIRPORT AUTHORITY HANGAR FOUNDATION DESIGN | GRAND ISLAND, NEBRASKA

Designed the foundation for a 50,000+ square foot hangar subject to extremely high uplift pressures. Design included numerous spread footers connected with structural beams, as well as hangar slab and airport ramp design. (Olsson Associates, 2002 to 2003)

FITZSIMMONS HEALTH COMPLEX MRI FACILITY FOUNDATION DESIGN | DENVER, COLORADO

Provided preliminary foundation designs for a MRI facility sensitive to ground vibration and settlement. (Olsson Associates, 2002)

Professional Affiliations

American Society of Civil Engineers, Member

Publications / Presentations

Purdy J, et al., 2012. *Lining Steep Rock Slopes with a Geomembrane Liner to Facilitate Tailings Facility Expansion*. Tailings and Mine Waste 2012, Proceedings of the 16th Tailings and Mine Waste Conference, Keystone, CO, 2012.

Purdy J, et al., 2004. *Cerro Santa Rosa Tailings Dam: Storage Capacity Increased Using a Unique Mechanically Stabilized Earth Design*” Tailings and Mine Waste 2004, Proceedings of the 11th Tailings and Mine Waste Conference, Vail, CO, 2004.

Purdy J, Henderson M, and Delaney T, 2002. *Performance of Vertical Wick Drains at the Atlas Uranium Mill Tailings Facility After 1 Year*. Tailings and Mine Waste 2002, Proceedings of the 9th Tailings and Mine Waste Conference, Fort Collins, CO, 2002.

Purdy J, 2001. *Performance of Vertical Wick Drains at the Atlas Moab Uranium Mill Tailings Facility*. Geotechnical News, 2001.

Employment History

CURRENT EMPLOYER	TIERRA GROUP INTERNATIONAL, LTD.
POSITION	Senior Geotechnical Engineer
YEARS	2012 to Present
EMPLOYER	TETRA TECH, INC.
POSITION	Senior Geotechnical Engineer
YEARS	2008 to 2011

EMPLOYER	APPLIED GEOTECHNICAL ENGINEERING, INC.
POSITION	Geotechnical Engineer
YEARS	2005 to 2008
EMPLOYER	VECTOR COLORADO, LLC
POSITION	Geotechnical Engineer
YEARS	2003 to 2005
EMPLOYER	OLSSON ASSOCIATES
POSITION	Staff Engineer
YEARS	2002 to 2003
EMPLOYER	STEFFEN ROBERTSON AND KIRSTEN (US), INC.
POSITION	Staff Engineer
YEARS	2000 to 2001

Language Proficiency

French: Fluent
Spanish: Conversational (spoken, written)