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№ 168-03/03

# TEXNIK TOPSHIRIQ
## Sarikul volfram konini o‘zlashtirish loyihasi uchun chiqindi tog‘ jinslari tashlamasini (otval) mufassal loyihalash bo‘yicha

# TECHNICAL SPECIFICATION
## WSD Detail Engineering for Sarikul Tungsten Project

**Tashkent 2026**

| **Scope of Work for the WDS, Stockpile and Facility Areas Detail Engineering** | **Otval, Uyum va Inshootlar Maydonlari bo'yicha Batafsil Muhandislik ishlari Ko'lami** |
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| **Project:** Sarykul Project<br><br>**Client:** Uzbekistan Technological Metals Complex JSC<br><br>**Document basis:** Scope of Work for the WDS, Stockpile and Facility Areas Detail Engineering, Rev 1<br><br>**Date:** 13.05.2026 | **Loyiha:** Sarykul loyihasi<br><br>**Buyurtmachi:** "O'zbekiston texnologik metallar kombinati" AJ<br><br>**Hujjat asosi:** Otval, Uyum va Inshootlar Maydonlari bo'yicha Batafsil Muhandislik ishlari Ko'lami, 1-tahrir<br><br>**Sana:** 13.05.2026 |
| **1. Introduction** | **1. Kirish** |
| This document has been prepared to support the Client in the development of a Request for Proposal (RFP) package intended for third-party engineering firms. Its purpose is to clearly communicate the expected scope, deliverables, and technical responsibilities required for the design and assessment of non-process infrastructure, excluding TSF (WDS, stockpile, facility areas, camp areas, and roads) and associated infrastructure across the Client's various projects. By defining these expectations in advance, the Client ensures consistency, transparency, and comparability during the proposal evaluation process.<br><br>The Scope of Work outlines the full set of engineering tasks that prospective engineering firms may be expected to | Ushbu hujjat Buyurtmachiga uchinchi tomon muhandislik kompaniyalari uchun mo'ljallangan Tijorat taklifini so'rash (RFP) to'plamini ishlab chiqishda yordam berish maqsadida tayyorlangan. Uning maqsadi Buyurtmachining turli loyihalari doirasida TSF dan tashqari (Otval, uyum, inshootlar maydonlari, lager maydonlari va yo'llar) texnologik bo'lmagan infratuzilmani va tegishli infratuzilmani loyihalash hamda baholash uchun talab qilinadigan kutilayotgan ishlar ko'lamini, natijalarni va texnik mas'uliyatlarni aniq yetkazishdir. Ushbu kutilmalarni oldindan belgilash orqali Buyurtmachi takliflarni baholash jarayonida izchillik, shaffoflik va taqqoslanuvchanlikni ta'minlaydi.<br><br>Ishlar Ko'lami istiqbolli muhandislik kompaniyalari bajarishi kutilayotgan muhandislik vazifalarining to'liq to'plamini belgilab beradi. Ushbu |

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| undertake. These tasks generally include:<br><br>• Planning, managing, and interpreting geotechnical and hydrogeological investigations;<br>• developing geological, geotechnical, and hydrogeological models;<br>• completing surface water management and system designs;<br>• preparing detailed earthwork designs;<br>• supporting the preparation of construction bidding documents; and<br>• supplying technical review, reporting, and follow-up documentation as required.<br><br>The content of this document provides a structured framework that engineering firms can use to prepare accurate technical proposals, schedules, and cost estimates. It also enables the Client to set clear expectations regarding design standards, deliverable formats, coordination requirements, and the overall workflow anticipated during the engineering stages of TSF-related projects. | vazifalar odatda quyidagilarni o'z ichiga oladi:<br><br>• Geotexnik va gidrogeologik qidiruv ishlarini rejalashtirish, boshqarish va sharhlash;<br>• geologik, geotexnik va gidrogeologik modellarni ishlab chiqish;<br>• yer usti suvlarini boshqarish va tizim dizaynlarini yakunlash;<br>• tuproq ishlarining batafsil chizmalarini tayyorlash;<br>• qurilish uchun tender hujjatlarini tayyorlashni qo'llab-quvvatlash; va<br>• zaruratga qarab texnik ko'rib chiqish, hisobot berish va keyingi hujjatlarni taqdim etish.<br><br>Ushbu hujjatning mazmuni muhandislik kompaniyalari aniq texnik takliflar, jadvallar va xarajatlar smetasini tayyorlashda foydalanishi mumkin bo'lgan tizimli asosni taqdim etadi. Shuningdek, u Buyurtmachiga loyihalash standartlari, taqdim etiladigan hujjatlar formatlari, muvofiqlashtirish talablari va TSF bilan bog'liq loyihalarning muhandislik bosqichlarida kutilayotgan umumiy ish oqimi bo'yicha aniq talablarni belgilash imkonini beradi. |
| **2. Nomenclature** | **2. Atamalar** |
| **TMK/Client:** Uzbekistan Technological Metal Complex JSC | **TMK/Buyurtmachi:** O'zbekiston texnologik metallar kombinati AJ |

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| **TSF:** Tailings storage facility | **TSF:** Qoldiqlarni saqlash inshooti |
| **WDS:** Waste dump storage | **WDS(Otval):** Chiqindi tog' jinslarini saqlash joyi, ag'darma; |
| **SWM:** Surface water management | **SWM:** Yer usti suvlarini boshqarish |
| **SoW:** Scope of works | **SoW:** Ishlar ko'lami |
| **MoM:** Minutes of the meeting | **MoM:** Yig'ilish bayonnomasi |
| **TEM:** Technical memorandum | **TEM:** Texnik memorandum |
| **GI:** Geotechnical investigation | **GI:** Geotexnik qidiruv |
| **IFC:** Issued for construction | **IFC:** Qurilish uchun berilgan (Ishchi chizmalar) |
| **FS:** Feasibility study | **FS:** Texnik-iqtisodiy asoslash (TIA) |
| **3. Scope of Work** | **3. Ishlar ko'lami** |
| **B1 - Geotechnical and Hydrogeological Works** | **B1 - Geotexnik va gidrogeologik ishlar** |
| **B1.1 Supervision of Borehole Drillings, Trial Pits, and In-Situ Tests** | **B1.1 Quduqlarni burg'ulash, sinov shurflari va dala sinovlarini nazorat qilish** |
| Boreholes and trial pits shall be supervised by the Consultant's experienced engineer, who shall adjust the geotechnical and hydrogeological investigations as required to optimize their effectiveness in collecting useful data and decrease the cost of site investigations. | Quduqlar va sinov shurflari (chuqurlari) Maslahatchining tajribali muhandisi tomonidan nazorat qilinishi kerak, u foydali ma'lumotlarni to'plash samaradorligini oshirish va maydon qidiruv ishlari xarajatlarini kamaytirish uchun zaruratga qarab geotexnik va gidrogeologik tekshiruvlarga tuzatishlar kiritadi. |
| Investigations shall include the WDS, stockpile and facility area locations, and potential borrow sources for various fill and construction materials, as necessary. Groundwater conditions shall be defined to determine | Qidiruv ishlari otval, uyum va inshoot maydonlari joylashuvini hamda zarur hollarda turli xil to'ldirish va qurilish materiallari uchun ehtimoliy karyer (karyer manbalari) joylarini o'z ichiga olishi kerak. Ostki drenaj talablarini |

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| underdrain requirements. | aniqlash uchun yer osti suvlari holati belgilanishi kerak. |
| Site investigations shall consist of a field investigation to characterize the subsurface conditions for all related facilities and structures. This task includes the following items: | Maydon qidiruv ishlari barcha tegishli inshootlar va tuzilmalar uchun yer osti sharoitlarini tavsiflash maqsadida dala qidiruvlaridan iborat bo'ladi. Ushbu vazifa quyidagi bandlarni o'z ichiga oladi: |
| • Supervision drilling exploratory boreholes; | • Qidiruv quduqlarini burg'ulashni nazorat qilish; |
| • Identification of test pits and trenches locations; | • Sinov chuqurlari va xandaklar (transheyalar) joylashuvini aniqlash; |
| • Supervision for geophysical investigations; | • Geofizik tekshiruvlarni nazorat qilish; |
| • Preparing a laboratory testing program for soil and rock samples and evaluation of results; | • Tuproq va tog' jinsi namunalari uchun laboratoriya sinov dasturini tayyorlash va natijalarni baholash; |
| • Supervision for in-situ testing. | • Dala (in-situ) sinovlarini nazorat qilish. |
| Several boreholes shall be advanced within the footprint of each structure being investigated as part of this task, typically at least 10 meters into the upper portions of the bedrock. For open pit slope design, core-oriented drillings or a televiewer may be required. This proposal assumes the Client shall provide site investigation works, including borehole drilling, in-situ testing, geophysical investigations, and laboratory test works. All drillings and test pits shall be logged in the field at the time of their advance by a qualified engineer/geologist who shall also be involved in the design of facilities. The minimum data to be | Ushbu vazifa doirasida o'rganilayotgan har bir inshootning qurilish maydoni daxlida bir nechta quduqlar qazilishi kerak, odatda tub tog' jinslarining yuqori qismiga kamida 10 metr kirib boriladi. Ochiq kon yonbag'irlarini loyihalash uchun kernni yo'naltirilgan burg'ulash yoki televyuyer talab qilinishi mumkin. Ushbu taklif Buyurtmachi maydon qidiruv ishlarini, jumladan quduq burg'ulash, dala sinovlari, geofizik tekshiruvlar va laboratoriya sinov ishlarini ta'minlashini nazarda tutadi. Barcha burg'ulashlar va sinov chuqurlari qazish vaqtida obyektlarni loyihalashda ishtirok etadigan malakali |

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| obtained from the boreholes shall be as follows: | muhandis/geolog tomonidan dalaning o'zida qayd etib (jurnalga yozib) borilishi kerak. Quduqlardan olinadigan minimal ma'lumotlar quyidagilardan iborat bo'lishi kerak: |
| • Time and date of start and completion of each drilling | • Har bir burg'ulashning boshlanish va tugash vaqti va sanasi |
| • Reference numbers of boreholes | • Quduqlarning ma'lumotnoma raqamlari |
| • Location and ground surface elevation of boreholes (surveyed by the Client) | • Quduqlarning joylashuvi va yer yuzasi balandligi (Buyurtmachi tomonidan o'lchangan) |
| • Depth to changes in strata | • Qatlamlar o'zgarishi chuqurligi |
| • Rock type and depths of samples | • Tog' jinsi turi va namunalarning chuqurligi |
| • Depth of groundwater, if encountered | • Yer osti suvlari chuqurligi, agar uchrasa |
| • SPT values for soils | • Tuproqlar uchun SPT qiymatlari |
| • RQD values for rock | • Tog' jinslari uchun RQD qiymatlari |
| The Consultant proposes to supplement the boreholes with a series of test pits and trenches excavated using a track hoe (to be provided by the Client). The test pits and trenches shall allow for investigations over a broader area while minimizing the number of boring and overall cost. They shall also enable bulk samples to be collected to evaluate construction material sources and characteristics more effectively. The purpose of the test pits shall be to characterize the surficial soil material. | Maslahatchi quduqlarni zanjirli ekskavator (Buyurtmachi tomonidan taqdim etiladi) yordamida qazilgan bir qator sinov chuqurlari va xandaklar bilan to'ldirishni taklif qiladi. Sinov chuqurlari va xandaklar burg'ulashlar sonini va umumiy xarajatlarni minimallashtirgan holda kengroq hududda tekshiruvlar o'tkazish imkonini beradi. Shuningdek, ular qurilish materiallari manbalari va xususiyatlarini samaraliroq baholash uchun quyma namunalarni olishga imkon beradi. Sinov chuqurlarining |

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| | maqsadi yer yuzasidagi tuproq materiallarini tavsiflashdir. |
| Several samples of soil and rock shall be collected from various depths of each borehole and test pit. If available, a soil laboratory in Uzbekistan can be used and supplemented with outside laboratories (Turkey, USA, etc.). | Har bir quduq va sinov chuqurining turli chuqurliklaridan bir nechta tuproq va tog' jinsi namunalari olinishi kerak. Agar mavjud bo'lsa, O'zbekistondagi tuproq laboratoriyasidan foydalanish mumkin hamda chet el laboratoriyalari (Turkiya, AQSh va boshqalar) bilan to'ldirilishi mumkin. |
| The site engineer shall be responsible for the following works; | Maydon muhandisi quyidagi ishlar uchun javobgar bo'ladi; |
| • Geotechnical logging of boreholes; | • Quduqlarni geotexnik hujjatlashtirish (karotaj); |
| • Management and recording of in-situ tests and sampling; | • Dala sinovlari va namuna olishni boshqarish va qayd etish; |
| • Preparing laboratory test work program. | • Laboratoriya sinov ishlarining dasturini tayyorlash. |
| **B1.2 Laboratory Test Work Management** | **B1.2 Laboratoriya sinov ishlarini boshqarish** |
| The Consultant shall manage the test program and test configurations and maintain communications. | Maslahatchi sinov dasturini va sinov konfiguratsiyalarini boshqaradi hamda aloqalarni qo'llab-quvvatlaydi. |
| The laboratory tests help understand the geotechnical conditions and parameters of both the foundation and fill material. Therefore, the Consultant shall follow the laboratory studies and give necessary directions to simulate the site conditions. | Laboratoriya sinovlari ham poydevor, ham to'ldirish materialining geotexnik sharoitlari va parametrlarini tushunishga yordam beradi. Shu sababli, Maslahatchi laboratoriya tadqiqotlarini kuzatib borishi va maydon sharoitlarini simulyatsiya qilish uchun zarur ko'rsatmalarni berishi kerak. |
| In addition to core or pit samples, the Consultant shall ask to perform some tests on tailings produced by the Client (or by others) in the laboratory conditions. Except for simple soil | Kern yoki chuqur namunalaridan tashqari, Maslahatchi Buyurtmachi (yoki boshqalar) tomonidan ishlab |

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| laboratory tests like identification tests (specific gravity, Atterberg limits, sieve/hydrometer tests, etc.), large-scale seepage-induced consolidation test (SICT) may be necessary that can only be performed in the USA. | chiqarilgan qoldiqlar ustida laboratoriya sharoitida ba'zi sinovlarni o'tkazishni so'raydi. Identifikatsiya sinovlari (solishtirma og'irlik, Atterberg chegaralari, elak/gidrometr sinovlari va boshqalar) kabi oddiy tuproq laboratoriya sinovlaridan tashqari, faqat AQShda o'tkazilishi mumkin bo'lgan yirik miqyosdagi sizib o'tish ta'sirida konsolidatsiya sinovi (SICT) ham talab qilinishi mumkin. |
| **B1.3 Geological Hazard Assessment** | **B1.3 Geologik xavflarni baholash** |
| Based on the available data and visual inspection during the site visit, a geological hazard, as well as a risk assessment consisting of landslide potential, rock fall, seismic risk, and unfavorable ground conditions of the whole project area, except for TSF, including WDS, stockpile, facility areas, and open pit shall be performed and summarized.<br><br>The Consultant shall provide a TEM to issue geological hazard assessment studies. | Mavjud ma'lumotlar va obyektdagi vizual tekshiruvga asoslanib, TSF dan tashqari butun loyiha hududida, jumladan otval, uyum, inshootlar maydoni va ochiq konda yer ko'chkisi xavfi, tosh qulashi, seysmik xavf va noqulay yer sharoitlarini o'z ichiga olgan geologik xavf va tavakkalchiliklar baholanishi hamda xulosa qilinishi kerak.<br><br>Maslahatchi geologik xavflarni baholash bo'yicha tadqiqotlarni taqdim etish uchun TEM tayyorlab berishi kerak. |
| *Site-Wide Geological Map* | *Butun maydonning geologik xaritasi* |
| Site-wide geological settings shall be evaluated with the borehole results. Surface geology work shall consist of topsoil identification, exposed geological units, surface structures, identification of surface water existence, natural flow beds, potential geohazards, and performing fault survey if quaternary faults exist. | Butun maydonning geologik sharoitlari quduq natijalari yordamida baholanishi kerak. Yer usti geologik ishlari tuproqning ustki qatlamini aniqlash, ochiq geologik birliklar, yer usti tuzilmalari, yer usti suvlarining mavjudligini aniqlash, tabiiy oqim o'zanlari, potentsial geologik xavflar va agar to'rtlamchi davr yoriqlari mavjud |

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| | bo'lsa, yoriqlarni o'rganishdan iborat bo'ladi. |
| Structures on the geological map shall be drawn, and measurements shall be evaluated using most suitable software. | Geologik xaritadagi tuzilmalar chizilishi va o'lchovlar eng mos dasturiy ta'minot yordamida baholanishi kerak. |
| **B2 Preliminary Design** | **B2 Dastlabki loyihalash** |
| **B2.1 Data Collection, Creation, and Review of Previous Studies** | **B2.1 Ma'lumotlarni to'plash, yaratish va oldingi tadqiqotlarni ko'rib chiqish** |
| The Consultant shall issue a TEM to request any available data and information related to the Project area, including topographical maps, meteorological / flow measurements, conceptual layouts, available geological information and maps, borehole logs, and core box photos for any drillings, etc. Then, the Consultant shall review and evaluate all available data and discuss with the Client to identify project requirements and enhancement for further studies. | Maslahatchi Loyiha hududiga tegishli har qanday mavjud ma'lumot va axborotlarni, jumladan topografik xaritalar, meteorologik/oqim o'lchovlari, konseptual sxemalar, mavjud geologik ma'lumotlar va xaritalar, quduq jurnallari va har qanday burg'ulash uchun kern qutilari fotosuratlari va boshqalarni so'rash uchun TEM chiqarishi kerak. Keyin Maslahatchi barcha mavjud ma'lumotlarni ko'rib chiqadi va baholaydi hamda keyingi tadqiqotlar uchun loyiha talablari va takomillashtirishlarni aniqlash maqsadida Buyurtmachi bilan muhokama qiladi. |
| **B2.2 Site Visit and Reconnaissance, Kickoff Meeting** | **B2.2 Obyektga tashrif va o'rganish, Dastlabki yig'ilish (Kickoff Meeting)** |
| The Consultant shall organize a site visit after the preliminary office studies with the Client and the project team. The purpose of this site visit is to perform site reconnaissance, evaluate the surface geological conditions, | Maslahatchi Buyurtmachi va loyiha jamoasi bilan dastlabki ofis tadqiqotlaridan so'ng obyektga tashrif uyushtirishi kerak. Ushbu tashrifning maqsadi maydonni o'rganish, yer usti geologik sharoitlarini baholash, oldingi |

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| visualize the earlier studies, and better understand the project requirements.<br><br>A kickoff meeting shall be held during or after the site visit. A preliminary summary of findings and recommendations shall be discussed with the Client in this meeting.<br><br>The Consultant shall provide a follow-up TEM of the site visit to discuss the preliminary findings and to incorporate the established design criteria list and finalized structure locations for the further design stages. | tadqiqotlarni vizuallashtirish va loyiha talablarini yaxshiroq tushunishdir.<br><br>Tashrif davomida yoki undan keyin dastlabki ishga tushirish yig'ilishi (kickoff meeting) o'tkazilishi kerak. Ushbu yig'ilishda Buyurtmachi bilan topilmalar va tavsiyalarning dastlabki xulosasi muhokama qilinadi.<br><br>Maslahatchi keyingi loyihalash bosqichlari uchun dastlabki topilmalarni muhokama qilish hamda belgilangan loyiha mezonlari ro'yxati va tuzilmalarning yakuniy joylashuvini kiritish maqsadida tashrif yakunlari bo'yicha TEM taqdim etishi kerak. |
| **B2.3 Gap Analysis** | **B2.3 Bo'shliqlarni (Kamchiliklarni) tahlil qilish (Gap Analysis)** |
| Prior to the preliminary layout studies, consultant shall perform a gap analysis to identify critical missing information, data, and input for the project development. The gap analysis may result in the following:<br><br>• Modifications in selected facility locations,<br><br>• Acceptable material for the construction may not be found if overburden material and designated borrow material areas do not meet technical specifications in terms of geotechnical and geochemical aspects.<br><br>• Ensure that the field investigation program for the proposed structures | Dastlabki sxemalarni o'rganishdan oldin, maslahatchi loyihani rivojlantirish uchun muhim bo'lgan yetishmayotgan ma'lumotlarni va kirish parametrlarini aniqlash maqsadida bo'shliqlarni tahlil qilishi (gap analysis) kerak. Tahlil quyidagi natijalarga olib kelishi mumkin:<br><br>• Tanlangan inshoot joylashuviga o'zgartirishlar kiritish;<br><br>• Agar qoplovchi jinslar va belgilangan karyer materiallari maydonlari geotexnik va geokimyoviy jihatdan texnik shartlarga javob bermasa, qurilish uchun maqbul material topilmasligi mumkin.<br><br>• Taklif etilayotgan inshootlar uchun dala qidiruv dasturi mahalliy qoidalarga, yerga egalik huquqiga, |

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| meets the local regulations, land ownership, forestry, or other permits.<br><br>• Ensure the drilling contractor bears the requirement of technical specifications for geotechnical borehole drilling and laboratory test works, especially following the international standards and codes during the conduction of in situ tests.<br><br>The gap analysis shall be issued as TEM. | o'rmon xo'jaligiga yoki boshqa ruxsatnomalarga mos kelishini ta'minlash.<br><br>• Burg'ulash pudratchisi geotexnik quduqlarni burg'ulash va laboratoriya sinov ishlari bo'yicha texnik spetsifikatsiyalar talablariga rioya etishini, ayniqsa dala sinovlarini o'tkazishda xalqaro standartlar va qoidalarga amal qilishini ta'minlash.<br><br>Bo'shliqlarni tahlil qilish xulosasi TEM sifatida berilishi kerak. |
| **B2.4 Preliminary Layout Studies** | **B2.4 Dastlabki joylashuv (sxema) tadqiqotlari** |
| The preliminary facility layouts (WDS, stockpile, plant area, campsite, and roads) shall be studied in accordance with the allocated location. The preliminary layouts shall consist of 2D/3D string models for the Client review. This study shall be the fundamental study for the detailed design; therefore, it should be the first step of optimizations to satisfy the material balance. Additionally, this study shall define the facility footprints and shall also be a baseline for GI.<br><br>Preliminary layout studies in raw drawing format shall be shared with the Client. | Inshootlarning dastlabki sxemalari (otval, uyum, zavod maydoni, lager va yo'llar) ajratilgan joyga muvofiq o'rganilishi kerak. Dastlabki sxemalar Buyurtmachi ko'rib chiqishi uchun 2D/3D chiziqli (string) modellardan iborat bo'ladi. Ushbu tadqiqot batafsil loyihalash uchun fundamental o'rganish bo'ladi; shuning uchun materiallar balansini qanoatlantirish uchun bu optimallashtirishning birinchi qadami bo'lishi kerak. Bundan tashqari, ushbu tadqiqot inshootlarning o'lchamlarini belgilab beradi hamda GI (geotexnik qidiruv) uchun asosiy mezon bo'lib xizmat qiladi.<br><br>Xom chizma formatidagi dastlabki sxema tadqiqotlari Buyurtmachiga taqdim etilishi kerak. |
| **B3 Campsite and Main Access Road** | **B3 Lager va Asosiy kirish yo'li** |

| **B3.1 Earthwork Designs of Campsite** | **B3.1 Lager maydoni uchun tuproq ishlari dizayni** |
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| The engineering firm shall develop the complete earthwork design for the campsite area selected by the Client. The design shall consider site topography, constructability, drainage, stability, and integration with adjacent facilities | Muhandislik kompaniyasi Buyurtmachi tomonidan tanlangan lager maydoni uchun to'liq tuproq ishlari loyihasini ishlab chiqishi kerak. Loyiha maydon topografiyasi, qurish imkoniyati, drenaj, barqarorlik va tutash inshootlar bilan integratsiyani hisobga olishi lozim. |
| **B3.2 Main Access Road Design** | **B3.2 Asosiy kirish yo'lini loyihalash** |
| The engineering firm shall design the main access road connecting the existing roadway to the designated campsite. The design shall address geometry, geotechnical conditions, drainage, safety, and operational requirements in accordance with applicable standards. | Muhandislik kompaniyasi mavjud avtomobil yo'lini belgilangan lager bilan bog'laydigan asosiy kirish yo'lini loyihalashi kerak. Loyiha tegishli standartlarga muvofiq geometriya, geotexnik sharoitlar, drenaj, xavfsizlik va foydalanish talablarini hal qilishi lozim. |
| **B3.3 Climatology and Engineering Hydrology** | **B3.3 Klimatologiya va Muhandislik Gidrologiyasi** |
| The long-term climatological data and flow measurements shall be evaluated to prepare a comprehensive hydrological model of the site. The engineering hydrology study shall include the storm event calculations for upstream river sections. Some sediment trap structures may be proposed after this study. Storm event calculations shall be the base of the surface water management design during the detailed design phase. This study should also include the TSF and will be handed over to the TSF designer. | Maydonning keng qamrovli gidrologik modelini tayyorlash uchun uzoq muddatli klimatologik ma'lumotlar va oqim o'lchovlari baholanishi kerak. Muhandislik gidrologiyasi tadqiqoti yuqori oqimdagi daryo qismlari uchun kuchli yog'ingarchilik hodisalari hisob-kitoblarini o'z ichiga oladi. Ushbu tadqiqotdan so'ng ba'zi cho'kindi ushlagich tuzilmalari taklif qilinishi mumkin. Kuchli yog'ingarchilik hisob-kitoblari batafsil loyihalash bosqichida yer usti suvlarini boshqarish loyihasining asosi bo'ladi. Ushbu tadqiqot TSF ni ham qamrab olishi va TSF loyihachisiga topshirilishi kerak. |

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| Additionally, precipitation and evaporation data shall be evaluated for the water balance calculations performed by others.<br><br>The Consultant shall prepare a TEM to present the climatological and hydrological calculations. | Bundan tashqari, boshqalar tomonidan bajariladigan suv balansi hisob-kitoblari uchun yog'ingarchilik va bug'lanish ma'lumotlari baholanishi lozim.<br><br>Maslahatchi iqlim va gidrologik hisob-kitoblarni taqdim etish uchun TEM tayyorlashi kerak. |
| **B3.4 Surface Water Management System Design** | **B3.4 Yer usti suvlarini boshqarish tizimi dizayni** |
| Surface water management of the camp area, roads and open pit shall include but is not limited to the following structures.<br>• Sediment trap structure(s) design<br>• Perimeter channel(s) design<br>• Chute and energy dissipator design<br>The hydraulic calculation and sizing of structures and channels shall be included in a TEM named surface water management plan. The details of the structures shall be provided in the design drawings. | Lager maydoni, yo'llar va ochiq konning yer usti suvlarini boshqarish quyidagi tuzilmalarni o'z ichiga oladi, lekin ular bilan cheklanmaydi:<br>• Cho'kindilarni ushlash tuzilmasi (tuzilmalari) dizayni<br>• Perimetr bo'ylab kanal(lar) dizayni<br>• Nov va energiya so'ndirgich dizayni<br>Inshootlar va kanallarning gidravlik hisob-kitobi va o'lchamlarini belgilash "yer usti suvlarini boshqarish rejasi" nomli TEM ga kiritilishi kerak. Inshootlarning tafsilotlari loyiha chizmalarida taqdim etiladi. |
| **B4 Waste Dump Storage and Stockpile** | **B4 Chiqindilarni saqlash joyi (otvali) va Uyum (Shtabel)** |
| **B4.1 Design Criteria Memo** | **B4.1 Loyiha mezonlari memorandumi** |
| A comprehensive design criteria memo shall be prepared after the completion of preliminary design works and geotechnical investigations and submitted by the Consultant as a separate TEM. | Dastlabki loyihalash ishlari va geotexnik tekshiruvlar tugallangandan so'ng, keng qamrovli loyiha mezonlari memorandumi tayyorlanishi va Maslahatchi tomonidan alohida TEM sifatida taqdim etilishi kerak. |

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| In preparing this TEM, the Consultant shall work with the process design consultant to obtain any essential heap material properties and metallurgical leaching requirements. | Ushbu TEM ni tayyorlashda, Maslahatchi uyum materialining muhim xususiyatlarini va metallurgik tanlab eritish (leaching) talablarini olish uchun texnologik jarayonlarni loyihalash bo'yicha maslahatchi bilan hamkorlik qilishi kerak. |
| This TEM, which is subject to be revised if deemed necessary during the lifetime of the design, shall include all selected parameters and assumptions regarding the design requirements and the site-specific conditions. On the other hand, any changes after the final issue of this memo may result in a future scope change request, depending on the effect of the shift in the design. | Loyihani amalga oshirish muddati davomida zarur deb topilsa qayta ko'rib chiqilishi mumkin bo'lgan ushbu TEM loyiha talablari va maydonning o'ziga xos shartlariga oid barcha tanlangan parametrlar va taxminlarni o'z ichiga olishi kerak. Boshqa tomondan, ushbu memorandum yakuniy nashr etilgandan so'ng kiritilgan har qanday o'zgartirish, loyihaga ta'siriga qarab kelajakda ishlar ko'lamini o'zgartirish talabiga olib kelishi mumkin. |
| **B4.2 Site Preparation and Stacking Design** | **B4.2 Maydonni tayyorlash va Tahkash (stacking) dizayni** |
| Taking the stability analysis into consideration, benching, berm widths, and slope angles shall be the major inputs for the geometric model. Accordingly, a 3-D solid stacking model shall be prepared for WDS/Stockpile. The model shall be prepared to maximize the storage volume and minimize the unit deposition cost. | Barqarorlik tahlilini hisobga olgan holda, pog'onalar (benching), bermalar kengligi va yonbag'ir burchaklari geometrik model uchun asosiy ma'lumotlar bo'lishi kerak. Shunga mos ravishda, Otval/Uyum uchun 3D formatdagi qattiq taxlash modeli tayyorlanadi. Model saqlash hajmini maksimal darajada oshirish va saqlashning birlik xarajatlarini minimallashtirish maqsadida tayyorlanishi lozim. |
| The necessity and height of the stability buttress (embankment) shall be determined in this scope based on the stability analysis. | Barqarorlashtiruvchi tirgak (kontrfors) zarurati va balandligi ushbu ish ko'lamida barqarorlik tahlili asosida belgilanadi. |

| **B4.3 Stability Calculations** | **B4.3 Barqarorlik hisob-kitoblari** |
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| The Consultant shall use engineering software (Rocscience, Geo5, GeoStudio, Midas GTS, Plaxis, etc.) in order to analyze the stability of the stacked tailings and waste material. The soil-geosynthetic and geosynthetic-geosynthetic interface should be taken into consideration. | Maslahatchi taxlangan qoldiqlar va chiqindi materiallarning barqarorligini tahlil qilish uchun muhandislik dasturiy ta'minotidan (Rocscience, Geo5, GeoStudio, Midas GTS, Plaxis va boshqalar) foydalanishi kerak. Tuproq-geosintetik va geosintetik-geosintetik tutashuv yuzalari hisobga olinishi lozim. |
| **B4.4 Surface Water Management System Design** | **B4.4 Yer usti suvlarini boshqarish tizimi dizayni** |
| Surface water management of WDS and stockpile area shall include but is not limited to the following structures.<br>• Sediment trap structure(s) design<br>• Perimeter channel(s) design<br>• Chute and energy dissipator design<br>The hydraulic calculation and sizing of structures and channels shall be included in a TEM named surface water management plan. The details of the structures shall be provided in the design drawings. | Otval va uyum maydonini yer usti suvlarini boshqarish quyidagi tuzilmalarni o'z ichiga oladi, lekin ular bilan cheklanmaydi:<br>• Cho'kindilarni ushlash tuzilmasi (tuzilmalari) dizayni<br>• Perimetr bo'ylab kanal(lar) dizayni<br>• Nov va energiya so'ndirgich dizayni<br>Inshootlar va kanallarning gidravlik hisob-kitobi va o'lchamlarini belgilash "yer usti suvlarini boshqarish rejasi" nomli TEM ga kiritilishi kerak. Inshootlarning tafsilotlari loyiha chizmalarida taqdim etiladi. |
| **B4.5 Drainage System Design** | **B4.5 Drenaj tizimi dizayni** |
| All of the components of the drain system (trenches, collection pipes, sump, etc.) shall be designed at this stage.<br>• Drainage Piping Design<br>The WDS/Stockpile area drains shall collect and route natural seepage flows | Drenaj tizimining barcha tarkibiy qismlari (xandaklar, yig'ish quvurlari, suv yig'gichlar va h.k.) ushbu bosqichda loyihalashtirilishi kerak.<br>• Drenaj quvurlarini loyihalash<br>Otval/Uyum maydonidagi drenajlar qoplamali hudud ostidagi tabiiy sizib |

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| and percolated waters beneath the lined area to a downstream monitoring pond for monitoring water quality.<br><br>• Monitoring Pond Design<br><br>Collected water by the drainage piping system shall be diverted to a downstream pond for monitoring water quality. The system shall allow the monitored drainage flows to flow by gravity to the downstream natural drainage if water quality is acceptable. | chiquvchi oqimlarni va süzülgan suvlarni to'plab, suv sifatini nazorat qilish maqsadida quyi oqimdagi nazorat hovuziga yo'naltirishi kerak.<br><br>• Nazorat hovuzi dizayni<br><br>Drenaj quvurlari tizimi orqali to'plangan suv sifatini nazorat qilish uchun quyi oqimdagi hovuzga yo'naltiriladi. Tizim, agar suv sifati maqbul bo'lsa, nazorat ostidagi drenaj oqimlarining tortishish kuchi bilan quyi oqimdagi tabiiy drenajga oqishiga imkon berishi kerak. |
| **B4.6 Geotechnical and Borrow Source Investigation Report (WRD)** | **B4.6 Geotexnik va Karyer manbalarini o'rganish hisoboti (WRD)** |
| Upon the conclusion of the subsurface investigations, separate Geotechnical and Borrow Source Investigation Reports shall be issued to provide the findings of the site investigations and estimate engineering parameters for the design of the WDS and stockpile area.<br><br>This report shall include, at a minimum:<br><br>• Logs, photos, and maps for each borehole, test pit, and trench;<br><br>• Regional and local geology;<br><br>• Soil and rock laboratory test results;<br><br>• Results of in-situ tests; | Yer osti tekshiruvlari yakunlangach, maydon qidiruv natijalarini taqdim etish hamda otval va uyum maydonini loyihalash uchun muhandislik parametrlarini baholash maqsadida alohida Geotexnik va Karyer Manbalarini o'rganish hisobotlari berilishi kerak.<br><br>Ushbu hisobot, kamida quyidagilarni o'z ichiga olishi kerak:<br><br>• Har bir quduq, sinov chuquri va xandak (transheya) uchun jurnallar (karotaj), fotosuratlar va xaritalar;<br><br>• Mintaqaviy va mahalliy geologiya;<br><br>• Tuproq va tog' jinslarini laboratoriyada sinash natijalari;<br><br>• Dala (in-situ) sinovlari natijalari; |

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| • Engineering assessment and recommendations;<br>• Results of the borrow source investigation, including recommended material use.<br>• The final version of the report shall include geotechnical plans and sections of the proposed structures. | • Muhandislik bahosi va tavsiyalar;<br>• Karyer manbalarini o'rganish natijalari, jumladan tavsiya etilgan materiallardan foydalanish;<br>• Hisobotning yakuniy tahriri tavsiya etilayotgan inshootlarning geotexnik rejalari va kesimlarini o'z ichiga olishi kerak. |
| **B4.7 Design Report** | **B4.7 Loyiha hisoboti** |
| The Consultant shall submit a Design Report, including all data, calculations, analysis, and outputs. | Maslahatchi barcha ma'lumotlar, hisob-kitoblar, tahlillar va natijalarni o'z ichiga olgan Loyiha hisobotini taqdim etishi kerak. |
| **B4.8 IFC Drawings** | **B4.8 IFC Chizmalari (Qurilish uchun berilgan chizmalar)** |
| The issued for construction (IFC) drawings shall be created with AutoCAD and Bentley PowerCivil/OpenRoads software and can incorporate drawing templates, logos, and drawing numbering system, as preferred by the Client. The construction-level drawings are envisioned to include drawings with scales and units in the metric SI system. | Qurilish uchun berilgan (IFC) chizmalar AutoCAD va Bentley PowerCivil/OpenRoads dasturiy ta'minoti yordamida yaratilishi kerak hamda Buyurtmachi xohishiga ko'ra chizma shablonlari, logotiplar va chizmalarni raqamlash tizimini o'z ichiga olishi mumkin. Qurilish darajasidagi chizmalar metrik SI tizimidagi masshtab va o'lchov birliklarini qamrab olishi ko'zda tutilgan. |
| **B5 Facility Areas and Roads** | **B5 Inshootlar maydonlari va Yo'llar** |
| **B5.1 Plant Earthwork Design** | **B5.1 Zavodning tuproq ishlari dizayni** |
| Once the footprints and layout arrangements of the facilities are provided by the plant designer, the Consultant shall provide the earthwork | Zavod loyihachisi tomonidan inshootlarning o'lchamlari va sxematik joylashuvi taqdim etilgandan so'ng, Maslahatchi zavod maydonining tuproq |

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| design of the plant area. The plant area earthwork design shall be integrated into the other structure sittings. | ishlari chizmalarini taqdim etishi kerak. Zavod maydonidagi tuproq ishlari loyihasi boshqa inshootlarning joylashuvi bilan integratsiyalashgan bo'lishi lozim. |
| **B5.2 Design of Facility Roads** | **B5.2 Inshoot yo'llarini loyihalash** |
| The Consultant shall provide the design of the following roads within the scope of this section:<br>• Access roads/utility corridor;<br>• Haul roads.<br>Roads shall be designed to reach each level of facilities. These roads are necessary during construction as well as operation and maintenance. Therefore, both construction and operation requirements shall be taken into consideration. The surface water channels and utility corridors should follow the road alignments as much as possible to reduce earthwork amounts. | Maslahatchi ushbu bo'lim doirasida quyidagi yo'llarning loyihasini taqdim etishi kerak:<br>• Kirish yo'llari/kommunikatsiya yo'lagi;<br>• Yuk tashish (karyer) yo'llari.<br>Yo'llar inshootlarning har bir qavatiga (darajasiga) yetib boradigan qilib loyihalashtirilishi kerak. Ushbu yo'llar qurilish jarayonida, shuningdek, foydalanish va texnik xizmat ko'rsatish davrida zarurdir. Shu sababli ham qurilish, ham foydalanish talablari hisobga olinishi lozim. Tuproq ishlari hajmini kamaytirish uchun yer usti suv kanallari va kommunikatsiya yo'laklari imkon qadar yo'l yo'nalishlariga mos kelishi kerak. |
| **B5.3 Surface Water Management System Design** | **B5.3 Yer usti suvlarini boshqarish tizimi dizayni** |
| Surface water management around the facility layouts, open pit and roads shall include but is not limited to the following structures.<br>• Sediment trap structure(s) design<br>• Perimeter channel(s) design | Inshootlar hududi, ochiq kon va yo'llar atrofidagi yer usti suvlarini boshqarish quyidagi tuzilmalarni o'z ichiga oladi, lekin ular bilan cheklanmaydi:<br>• Cho'kindilarni ushlash tuzilmasi (tuzilmalari) dizayni<br>• Perimetr bo'ylab kanal(lar) dizayni |

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| • Chute and energy dissipator design<br><br>The hydraulic calculation and sizing of structures and channels shall be included in a TEM named surface water management plan. The details of the structures shall be provided in the design drawings. | • Nov va energiya so'ndirgich dizayni<br><br>Inshootlar va kanallarning gidravlik hisob-kitobi va o'lchamlarini belgilash "yer usti suvlarini boshqarish rejasi" nomli TEM ga kiritilishi kerak. Inshootlarning tafsilotlari loyiha chizmalarida taqdim etiladi. |
| **B6 Additional Works** | **B6 Qo'shimcha ishlar** |
| **B6.1 Project Management** | **B6.1 Loyiha boshqaruvi** |
| Throughout the execution of the work, the Consultant shall facilitate as-needed physical or teleconference meetings with the overall project team to discuss technical issues and any critical observations that could impact proceedings.<br><br>The project management shall include appropriate periodic e-mail correspondence updates on work progress. In addition to a kickoff meeting planned during the site visit, separate meetings shall be conducted as necessary at substantial completion of the draft documents before finalizing the documents with MMG's comments.<br><br>The Consultant shall also issue MoM items related to the designs in her responsibility. | Ishni bajarish davomida Maslahatchi texnik masalalarni va jarayonga ta'sir qilishi mumkin bo'lgan har qanday tanqidiy kuzatuvlarni muhokama qilish uchun butun loyiha jamoasi bilan zaruratga qarab jismoniy yoki telekonferensiya uchrashuvlarini tashkillashtirishi kerak.<br><br>Loyiha boshqaruvi ishning borishi haqida elektron pochta orqali tegishli davriy yangilanishlarni o'z ichiga oladi. Obyektga tashrif chog'ida o'tkazilishi rejalashtirilgan dastlabki yig'ilishdan (kickoff meeting) tashqari, MMG izohlari bilan hujjatlarni yakunlashdan oldin, qoralama hujjatlar sezilarli darajada tayyor bo'lganda, zarur hollarda alohida yig'ilishlar o'tkazilishi lozim.<br><br>Maslahatchi o'z mas'uliyatidagi loyihalarga tegishli yig'ilish bayonnomasi (MoM) bandlarini ham chiqarishi kerak. |
| **B6.2 Document Preparation for Local Authority Approval** | **B6.2 Mahalliy organlar tasdig'i uchun hujjatlarni tayyorlash** |
| The Consultant shall assist a local company provided by the Client for | Maslahatchi mahalliy organlardan ruxsat olish maqsadida hujjatlarni |

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| localization of the documents to get approval from local authorities. | mahalliylashtirish uchun Buyurtmachi tomonidan taqdim etilgan mahalliy kompaniyaga yordam berishi kerak. |

**Quyidagilar tomonidan ishlab chiqildi va kelishildi / Developed and agreed by:**

Loyiha Ofisi Rahbari
Head of the Project Office — H. Boz

Konchilik bo'limi boshlig'i
Head of mining department — F. Kasa

Qurilish bolimi boshlig'i
Head of the Construction Department — O. Yılmaz

Loyiha Ofisi Rahbari o'rinbosari
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