BISON
IV OPERATING

STORMWATER MANAGEMENT PLAN

Remora Pad

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Introduction

Bison IV Operating (Bison) has prepared this document to satisfy the requirements of ECMC Rule 304.c.(15) to develop a site-specific stormwater management plan (SWMP), consistent with the requirements of ECMC Rule 1002.f., to accompany the Form 2A in order to demonstrate the Commission's Rules for the operation of the proposed oil and gas location in a manner that is protective of and minimizes adverse impacts to public health, safety, welfare, the environment, and wildlife resources.

Project Summary

Stormwater Management/Permit Coverage

Bison has a field-wide stormwater management plan (SWMP) that covers construction activities within a permitted area of the Denver-Julesburg Basin. The ***Remora Pad*** construction will occur within this permitted area. Construction activities within this area are covered under and governed by the CDPS General Permit for Discharges Associated with Construction Activity (Permit No. COR-400000).

BMPs will be employed in accordance with good engineering, hydrologic, and pollution control practices in order to prevent pollution in stormwater discharges associated with the construction of the subject facility. All information and conditions represented herein are estimated and intended as a preliminary plan. The SWMP is intended to be a living document that will change and be updated routinely as field conditions change. Actual placement of BMP's etc. may deviate from the preliminary plan based on actual conditions discovered in the field and updates will be made accordingly.

Site Description/Nature of Construction

Bison IV Operating (Bison) is proposing the construction, development, and operation of the Remora Pad Oil and Gas Development Plan (OGDP or Project), which includes the Remora Pad (Remora Well Pad, associated production equipment, pipelines, and access road). The legal and location descriptions for the Remora Well Pad are summarized in Table 1.

Table 1
Location Information

Location Name	Number of Wells	Formal Location Name	Legal Description
Remora Well Pad	16	Remora Pad	SW ¼ NW ¼ S6 T4S R63W 6th Principal Meridian

The Project consists of the development of the Remora Well Pad and associated infrastructure to support the drilling and production of 16 new oil and gas wells. The proposed Location is in an area with agricultural and rangeland activities, and few other existing oil and gas operations with the nearest producing well located over 1 mile away. Construction of the new Location would consist of roughing in a new access road and then leveling the pad. The access road connection for the Remora Pad would be from E Co Rd 6.

Well Pad Location

The Remora Well Pad would support a total of 16 wells and their supporting production equipment. Pad construction would also involve clearing vegetation, stripping, and stockpiling topsoil, and leveling. Construction equipment generally involves the use of heavy equipment, such as a dozer, flat blade, dump truck, and crane; however, equipment needs may vary depending on the site-specific conditions of the individual well pad.

Separate stockpiles for both topsoil and subsoil would be established within the permitted location boundaries and will be maintained for future backfilling and rehabilitation of the disturbed areas of the well pad for interim reclamation and final abandonment after the life of the wells.

Total initial area of disturbance is planned to be 20.0 acres. Bison plans to reclaim 10.48 acres, leaving 9.52 acres of well pad disturbance for the life of production.

Access Roads

A total of approximately 0.65 miles of new access road would be required to provide access to the proposed location. The new access road would be constructed such that it provides an approximate 24-foot running surface within a 30-foot-wide corridor. The construction of the initial, temporary access road would have a disturbance of approximately 2.36 acres of land for the life of the project.

Water Lines and Flowlines

The construction of the subject location would require temporary surface-laid, lay-flat water lines, which will be located within existing ditch infrastructure. While these water lines would be surface laid and would not require a trench, it is conservatively assumed that a corridor of approximately 30-feet would be needed for the installation of the lay-flat water line. This 30-foot corridor would be temporarily maintained while the water lines are needed during completion operations but would not result in any initial or residual disturbance. Additionally, flowlines installed for production operations of this location would be installed within the footprint of the well pad. Therefore, flowline disturbance is not calculated separately from the overall disturbance of the pad.

Interim Reclamation

In accordance with ECMC Rule 1003, interim reclamation for the Project will commence as soon as practicable and, at minimum, within 3 months following drilling and subsequent operations. Debris, waste material, and equipment associated with drilling, re-entry, and completion operations will be removed from the facility. All disturbed, non-working areas affected by drilling or subsequent operations, except those areas needed for production operations or for subsequent drilling operations to be commenced within 12 months, shall be reclaimed as nearly as practical to their original condition or their designated final land use. The disturbed areas will be ripped and returned to landowner for agricultural use and reincorporation into the surrounding fields. Some areas of the reclamation area may need to be seeded/mulched if these areas cannot be returned to cropland or if the landowner/farmer chooses not to reincorporate into the surrounding ag-field. Areas needed for production operations or for subsequent drilling operations to be commenced within 12 months will

be stabilized and maintained to minimize dust and erosion to the extent possible.

Surface Disturbance Totals

The limits of construction associated with the Project is 20 acres, and a residual interim disturbance of 9.52 acres after interim reclamation. Residual disturbance includes acreage that would remain disturbed for the life of the project (LOP), which is approximately 20-30 years plus the time required to successfully reestablish vegetation (those acres not subject to interim reclamation). As previously stated, site reclamation would be initiated for portions of the well pad not required for the continued operation of the well within 3 months of completion, weather permitting.

Project Schedule

Pending OGDP approval from the ECMC, the subject Location would likely be constructed in Q3 2024. Drilling and completion operations are anticipated to be over two occupations with the first planned for 2024 and the second planned for 2025. The anticipated production life of each well is 20-30 years.

Compaction Alleviation

Compacted soils and areas of the location impacted by construction that are to be reclaimed will be ripped to a minimum depth of 18 inches prior to topsoil replacement. Decompaction will be performed by a parabolic ag-style ripper capable of fracturing the soil ensuring soil layers are not mixed. Proper decompaction will allow for greater water infiltration and promote vegetation growth.

Recontouring

Working in conjunction with the site-specific storm water plan, Bison will complete interim reclamation by reestablishing all slopes, drainages, and natural contours that existed before initial construction began.

Bison will document the existing topography and natural drainages and the site will be planned in such a way to not impeded these drainages upon completion. The height of the well heads and tank battery will be set at native elevation, if not in conflict with the site-specific stormwater plan. The outer limits of the location will be blended back to native topography by matching the surrounding area of the location, as this area will remain undisturbed from the construction phase. Recontouring will take place in such a way that the depth of the topsoil is accounted for with the initial regrading of the site, this will ensure that an even and adequate amount of topsoil is spread over the entire site in a way that will not inhibit any natural drainages.

Bison will cross-rip slopes and prepare the reclaimed areas for agricultural-use (areas that can be farmed) or seed/mulch the areas that cannot be farmed.

Revegetation (if any areas cannot be returned to cropland)

The topsoil pile will be cat-tracked for temporary stabilization initially, but will be seeded/mulched for long-term/permanent stabilization. In addition to the topsoil pile, some areas of the reclamation area may need to be seeded/mulched if these areas cannot be returned to cropland or if the landowner/ farmer chooses not to reincorporate into the surrounding ag-field. Seed mix may be required by surface owner

and/or local agency in some cases. If no requirement is stated, the seed mix should be determined based on land use and soil type and in accordance with local regulations – in this case, from the Arapahoe County Grading, Erosion, and Sediment Control Manual (GESC) requirements. The seed mix to be used for the subject location's interim reclamation, on the topsoil pile and any areas that cannot be returned to cropland or where the landowner chooses not to reincorporate into the surrounding ag-field, was selected from the Arapahoe County GESC Manual. The seed mix consists of 10% western wheatgrass, 10% Canada wildrye, 10% needle and thread, 10% big bluestem, 10% slender wheatgrass, 10% Indian grass, 10% sideoats grama, 10% blue grama, 10% sand dropseed, 5% thickspike wheatgrass and 5% streambank wheatgrass. The Arapahoe County GESC Manual calls for an application rate of 15.5 pounds per acre.

Seedbed Preparation & Seeding (if any areas cannot be returned to cropland)

After decompaction, the top 3-4 inches of soil will be prepared for seed application using a high-speed disk and/or a mulcher as needed. Straw mulch will be applied and crimped to topsoil adding further stabilization and increasing moisture retention. Seedbed will be void of earthen clods and firm enough to keep seed from being applied to deeply. Soil samples can be collected and analyzed prior to seed application to identify any amendments needed. Compost and fertilizer can be applied based on current site conditions and on an as needed basis.

Seed application will be performed using a disc seed drill equipped with depth bands, capable of direct seed placement no deeper than ¼ to ¾ inches, and functioning packer wheels with row spacing not exceeding 8 inches to adequately cover and stabilize the seed. Seeding will follow interim reclamation and be conducted during a spring or fall planting window to achieve maximum germination rates.

Fencing

Where fencing is necessary, the fencing design will comply with Arapahoe County Fencing requirements provided Bison receives landowner approval.

Management of Invasive Plants

In accordance with the ECMC Rule 1003.f and the Colorado Noxious Weed Act, invasive plants will be monitored throughout all phases of construction during routine stormwater inspections, and the local weed division will be consulted when necessary. Bison maintains a weed mitigation maintenance schedule to prevent weed establishment on the topsoil pile and other areas of potential concern. Management will be performed by either mowing or spraying and on some occasions both methods may be necessary.

Interim Reclamation Completion

Interim reclamation of all disturbed areas no longer in use shall be considered complete when all ground surface disturbing activities at the site have been completed, and all disturbed areas have been either built on, compacted, covered, paved, or otherwise stabilized in such a way as to minimize erosion to the extent practicable, or a uniform vegetative cover has been established that reflects pre-disturbance or reference area forbs, shrubs, and grasses with total percent plant cover of at least eighty percent (80%) of pre-disturbance levels or reference areas, excluding noxious weeds. On cropland, the crops must be growing as well on the reclaimed areas as in a representative area of the surrounding field.

Once interim reclamation is achieved, a vegetation coverage assessment is conducted to confirm and document successful reclamation. In areas that were returned to cropland, this involves an assessment to show that crops are growing as well on the reclamation as in representative areas of the surrounding field. In the areas of the reclamation that cannot feasibly be farmed and will be seeded/mulched, this involves a vegetation coverage quantitative assessment. When a crop assessment and/or vegetation coverage assessment confirms that the requirements have been met, photos are collected to document interim reclamation completion. Four photos are taken from the pad reclamation during the growing season facing each cardinal direction, and one photo is taken to document the vegetation in an undisturbed/reference area adjacent to the pad. Each photograph is identified by date taken, well name or location number, GPS coordinates, and direction of view. A ECMC Form 4 Sundry Notice is then submitted to document interim reclamation completion, accompanied by the requisite photos documenting the reclamation and vegetation analysis. The Form 4 submission will also outline a description of the reclamation procedures, associated mitigation measures, changes to final land use, and the total cover of live perennial vegetation to evaluate the success of interim reclamation.

CDPHE Final Stabilization

CDPHE final stabilization is reached when all construction activities are complete and permanent stabilization methods have been implemented on all areas needed for ongoing production operations. For reclaimed areas that exist in cropland, final stabilization will be met on those areas when the reclamation has been returned to landowner for agricultural-use. In areas where seed/mulch has been applied, final stabilization is met when evenly distributed perennial vegetation has been established with a density of perennial plants of at least 70% of pre-disturbance levels has been achieved. When CDPHE final stabilization has been met for sites in non-crop land, quantitative vegetation density analyses are conducted to confirm and document that the site has met the vegetation requirement.

CDPHE Final Stabilization vs ECMC Interim Reclamation Completion

Bison recognizes that ECMC and CDPHE have different metrics and requirements pertaining to vegetation and final stabilization vs interim reclamation completion, and will adhere to both. Both sets of standards are outlined in the SWMP in an effort to be comprehensive of all applicable stormwater-related requirements.

Production

The production phase of the pad is characterized by the time from when the wells become productive until P&A and the final reclaim of the site. All areas not needed for ongoing operation will have been reclaimed and all areas needed for ongoing operation will have been stabilized for the long-term operating life of the pad.

Abandonment/Final Reclaim

Once the wells are no longer economical to operate, they will be P&A'd and the location recontoured and reclaimed to pre-disturbance conditions and/or in accordance with the surface owner's wishes.

When a well is P&A'd, the well head assembly is removed and the well permanently plugged downhole. All equipment associated with the well is removed from the location unless the equipment is also used by other wells on the pad or in the area. Flow lines may be re-routed or abandoned as necessary.

Once all equipment has been removed from the location and the well or wells are P&A'd, the location and associated access roads will be recontoured and reclaimed to pre-disturbance conditions and/or in accordance with the surface owner's wishes.

Rock surfacing on the pad and access roads will be removed for beneficial re-use or offsite disposal. Topsoil will be respread following recontouring and decompaction to pre-disturbance conditions. All culverts, cattle guards, or other extractable structural BMPs will be removed and either reused at new construction sites, recycled as scrap, or disposed of as solid waste.

Once the location is recontoured, topsoil is reapplied across the location in preparation for seeding or a return to agricultural-use. Appropriate seed mixtures are determined based on surface owner requirements, pre-existing site conditions and terrain characteristics. The reclamation is monitored until ECMC requirements are met and the location is cleared for final reclamation.

Supplemental Site Information

Distance to Water/Receiving Waters

According to publicly available Fish and Wildlife Services and National Hydrological Dataset data, the nearest downgradient waterbody is an unnamed intermittent stream ~.12 mile to the east. The unnamed stream is a tributary of West Sand Creek, which is a tributary of Sand Creek, which is a tributary of the South Platte River.

Disturbance Estimates

The limits of construction for this project is 20 acres. After drilling, completions, and interim reclamation, the interim pad disturbance is expected to be reduced to 9.52 acres (without access road), which is the anticipated size for the remainder of the life of the pad.

Soils & Erosion Risk

To determine anticipated site characteristics for the project site, Geographic Information System (GIS) data from the Natural Resource Conservation Service (NRCS) along with aerial photography was overlain on the site proposed disturbance boundary to derive potential ecological site descriptions (ESDs) and NRCS soil map units. A desktop review of the proposed project area indicates the presence of two soil map units – 97.6% of the project area consists of Nunn-Bresser-Ascalon complex (0 to 3 percent slopes) and 2.4% consisting of Bresser-Truckton sandy loams (3 to 5 percent slopes). Each soil map unit includes separate soil series types, all with slightly different attributes. According to the NRCS, the Nunn-Bresser-Ascalon complex soils map unit is expected to contain approximately 40% Nunn and similar soils, 25% Bresser and similar soils and 20% Ascalon and similar soils. Each soil series is broken out below with series specific characteristics and traits.

The Nunn (0 to 3 percent slopes) soil series in the soils map unit shows and anticipated topsoil depth of 0 to 8 inches. The depth to a restrictive feature is more than 80 inches. The drainage class is well drained, and the available water capacity is moderate (about 8.8 inches).

The Bresser (0 to 3 percent slopes) soil series in the soils map unit shows and anticipated topsoil depth of 0 to 6 inches. The depth to a restrictive feature is more than 80 inches. The drainage class is well drained, and the available water capacity is moderate (about 6.4 inches).

The Ascalon (0 to 3 percent slopes) soil series in the soils map unit shows and anticipated topsoil depth of 0 to 6 inches. The depth to a restrictive feature is more than 80 inches. The drainage class is well drained, and the available water capacity is moderate (about 6.7 inches).

According to the NRCS, the Bresser-Truckton sandy loams soils map unit is expected to contain approximately 55% Bresser and similar soils, 30% Truckton and similar soils and 15% of minor soil components.

The Bresser (3 to 5 percent slopes) soil series in the soils map unit shows and anticipated topsoil depth of 0 to 6 inches. The depth to a restrictive feature is more than 80 inches. The drainage class is well drained, and the available water capacity is moderate (about 6.7 inches).

The Truckton (3 to 5 percent slopes) soil series in the soils map unit shows and anticipated topsoil depth of 0 to 5 inches. The depth to a restrictive feature is more than 80 inches. The drainage class is well drained, and the available water capacity is low (about 6.0 inches).

Slopes in the project area range from 0-5%. The risk of susceptibility to erosion/runoff is low to moderate based on K factor values; the overall erosion hazard is slight.

Soils/erosion maps and soils reports can be found in Appendix A and B, respectively.

Pre-Disturbance Land Use and Vegetation

The pre-disturbance land use at the subject location is agriculture.

During the interim reclamation phase for the subject location, areas that can feasibly be farmed again will be ripped and returned to landowner for reincorporation into the surrounding agricultural field, while areas that cannot be farmed (due to physical machinery and/or irrigational constraints), or where the landowner chooses not to reincorporate into the surrounding ag-field, will be seeded and mulched. The majority or all of the reclaim the subject location is anticipated to be returned to agricultural use.

No vegetation density or coverage assessments were conducted at the project location due to the project being located within agricultural land-use. There are no known noxious weed infestations onsite.

Land use maps and pre-existing conditions/vegetation photo series and maps can be found in Appendix A.

Potential Sources of Pollution

This section considers potential pollutant sources generated by the construction process.

Disturbed and Stored Soils

The construction process will expose topsoil and sub-soils to wind and water erosion which can become pollutants to stormwater and waters of the state. The process of removing topsoil, cut and fill, grading and compaction operations will greatly decrease infiltration rates and increase runoff potential. Increased erosion and sediment movement by stormwater and wind will occur once existing vegetation is disturbed, especially along cut and fill slopes and large areas of disturbance.

Topsoil will be stockpiled onsite for later use in the reclamation process. Subsoils may also be stockpiled and stored depending on the cut and fill designs. Stockpiled soils are susceptible to erosion/sediment movement and can become a pollutant to stormwater and waters of the state. All stockpiled soils will be shown on the site-specific maps/diagrams along with appropriate BMPs.

When possible, existing vegetation will be preserved in place to minimize the disturbance footprint and prevent erosion using natural controls.

Stormwater runoff from all disturbed areas and soil storage areas for which permanent or temporary stabilization is not implemented, must flow to at least one control measure to minimize sediment in the discharge. This may be accomplished through filtering, settling, or straining. The control measure must be selected, designed, installed and adequately sized in accordance with good engineering, hydrologic and pollution control practices. The control measure(s) must contain or filter flows in order to prevent the bypass of flows without treatment and must be appropriate for stormwater runoff from disturbed areas and for the expected flow rate, duration, and flow conditions (i.e., sheet or concentrated flow).

The site-specific maps/diagrams in Appendix A and in future inspection reports show the areas of disturbance including cut and fill and soils stock piles, along with the BMPs implemented to manage stormwater.

Vehicle Tracking Controls

Offsite sediment tracking by vehicles is a potential pollutant source to stormwater and waters of the state. To address offsite sediment tracking, access roads shall be properly built to specifications and surfaced with rock/road base. Also, the working area on pads will be surfaced with rock/road base to limit the potential for vehicles to track mud offsite.

The subject location's access road leads to a paved road (E Co Rd 6). Vehicle tracking controls will be selected from Bison's BMP manual and installed to assist in removing mud from vehicles leaving the site. Installation of rock track pads, or other similar portable tracking installations, will be determined on a case-by-case basis and documented in the site-specific records. Cattle guards may be installed along access roads alone, or in conjunction with, track pads, to assist in removing mud before vehicles enter roadways.

Staff and contractor training will also reduce the likelihood of offsite sediment tracking by limiting the areas of operations during muddy conditions. If offsite sediment tracking onto adjacent paved roads is identified during inspections, street sweeping will be implemented as necessary and where practicable.

Management of Contaminated Soils

If contaminated soils are excavated at a Bison location, BMPs will be implemented to protect stormwater from contacting or becoming polluted by contaminated soils. Stockpiles of contaminated soil will be placed inside berms or containers, place on a liner and/or removed from the site and disposed of as soon as practicable at a location certified to handle such material.

Loading & Unloading

Loading and unloading operations of various materials can occur during any phase of construction, with the majority of events occurring during drilling and completions. Well drilling and completion surfactants, friction reducers, dilute hydrochloric acid, potassium chloride solutions, drilling mud, and other fluids/materials can be transported or unloaded directly into the well or to onsite tanks. Dry drilling mud components are contained in packaging and are stacked on pallets, which are unloaded using a forklift and stored in designated areas. Chemical loading and unloading will be conducted by onsite personnel and/or third-party contractors.

Outdoor Storage Activities

Outdoor storage is a potential pollutant source primarily during drilling and completion phases. Chemicals used in drilling and completion phases are stored in designated material storage areas and in staging areas. Dry and liquid materials are typically stored in original containers until ready for use. Dry materials are kept wrapped, covered or otherwise protected from contact with stormwater. Liquid materials are kept in sealed impermeable containers including bottles, buckets, drums and tanks. Secondary containment will be implemented under/around dry and liquid materials.

Storage areas shall be kept clean and organized in order to reduce the risk of polluting stormwater and facilitating identification of leaks and spills.

Diesel fuel, propane, gasoline, oil, hydraulic fluids, and solvents may be stored onsite. Materials of these types will be properly labeled and stored in temporary enclosures or bermed containment areas to avoid contact with stormwater. Dry chemicals, including dry drilling mud and similar materials, may be stored onsite. These materials will be properly labeled and stored off the ground surface or on ground protection to avoid impact from adverse weather conditions. Bison personnel are trained in spill response procedures that are established in the field-wide SPCC plan. Bison also implements waste control measures when appropriate at its construction sites.

Vehicle & Equipment Maintenance and Fueling

Routine vehicle and equipment maintenance and fueling operations shall be conducted offsite when possible. If required onsite, operations shall be conducted a safe distance from streams, wetlands, or other conveyances to waters of the state. All maintenance and fueling operations shall be continually

monitored by the personnel conducting the operations to prevent or minimize leaks or spills. Maintenance and fueling operations typically occur during the facility construction, drilling and completions phases.

If bulk storage tanks are stored on location, secondary containment will be installed according to the applicable SPCC regulations and the Bison field-wide SPCC plan.

Dust or Particulates

Dust/particulates are a potential pollutant source generated by earthmoving equipment during facility construction, vehicular traffic on graveled access roads, and during high wind events at sites with un-stabilized soils. Dust/particulates potential as a pollutant increases during hot and dry times of the year. All dirt/gravel roads and areas of disturbed soil shall be watered as often as necessary to mitigate dust/particulates as a pollutant. The Construction Foreman (construction phase), Company Man (drilling/completion phases), or EHS personnel (production phase) shall be responsible for determining when onsite conditions warrant applying dust suppression BMPs.

Dust suppression is typically achieved by applying either freshwater or a magnesium chloride solution.

Routine Maintenance

Maintenance involving fertilizers, pesticides, detergents, fuels, solvents, and oils may periodically be conducted on location. Maintenance associated with detergents, fuels, solvents and oils during each phase is possible, but predominantly occurs during the drilling and completions phases to support the drill rig and ancillary equipment.

There exists the potential for one-off applications of fertilizers and/or herbicides to a location primarily during the production phase. An example would be where reclamation success has not been achieved due to a soil limiting factor or where undesirable vegetation has become established.

Herbicides shall only be applied by trained personnel under the direct supervision of a licensed pesticide applicator.

Fertilizers will only be applied by experienced applicators. Fertilizers used for soil augmentation, hydro mulching, etc. will not be stored onsite and only brought onsite at the time of intended application. The amount of fertilizer brought onsite will vary by location and will be based on the application rate required and the size of the facility. Fertilizers will be stored in sealed containers, inside enclosed trailers or as otherwise protected to prevent contact with stormwater. Personnel applying the fertilizer will be responsible for monitoring leaks and spills. In the event of a leak or spill, applicator personnel shall notify EHS staff as soon as possible.

Onsite Waste Management Practices

Non-hazardous wastes generated during each operational phase will be collected in appropriate receptacles and periodically transported to licensed disposal or recycling facilities. Storage receptacles shall be designed to prevent contact of stormwater to stored wastes. Storage receptacles shall be routinely emptied on a schedule deemed appropriate by the Construction Supervisor, Company Man, or EHS personnel depending on the phase.

In the event that hazardous wastes are generated, the storage, transport and disposal shall meet all applicable local, state and federal regulations.

Hazardous and non-hazardous wastes will only be disposed of offsite. The dumping, burying or littering of wastes on the location are strictly prohibited. Proper training and enforcement for staff and contractors will ensure compliance with this plan and the protection of waters of the state.

Non-Industrial Waste Sources

The disposal of trash and litter on location or along the associated access roads is strictly prohibited except in designated receptacles. All trash and litter found on location or along access roads shall be cleaned up when found provided it is non-hazardous. Proper training of staff and contractors will mitigate the potential for trash and litter on locations.

Portable toilets and/or living facilities with sanitary waste systems will typically be onsite during the construction, drilling, and completions phases. Portable toilets may be stored at select locations throughout the field during the production phase. All portable toilets shall be staked, anchored or trailer mounted to prevent accidental tipping.

The routine cleaning and maintenance of these sanitary waste systems is handled by contractors on a schedule dictated by the volume of use.

Implementation of Control Measures

Structural Practices for Erosion & Sediment Control

Structural practices are those that require physical construction, installation, or manipulation. This includes structural features of a facility or access road designed to prevent erosion or control sediment movement. Structural erosion and sediment controls focus on two different processes although some of the BMP's can be applicable to both.

Erosion Control

Erosion control is the preferred method for protecting stormwater quality from degradation by sediment. Erosion control focuses on preventing soil from moving from its original/current location. Successful implementation of erosion control BMPs can prevent the need for sediment control BMPs. Erosion control BMPs will be implemented at each phase of construction, with site specific circumstances driving the selection of BMP type and installation location.

Structural erosion controls to be used at the subject location include the following:

- Earthen dike/berm
- Ditch/drainage swale
- Culvert
- Surface roughening/cat-tracking
- Hydro mulch/seeding
- Mulching

- Rip-rap
- Surface armor

Sediment Control

Sediment control BMPs are designed to retain sediment onsite and prevent degradation of stormwater quality. Sediment controls focus on settling or capturing suspended soil in stormwater before stormwater leaves the location. Sediment control BMPs will be implemented at each phase of construction, with site-specific circumstances driving the selection of BMP type and installation location.

Structural sediment control BMPs to be used at the subject location include the following:

- Surface roughening
- Sediment basin/retention pond
- Vehicle tracking control

Non-Structural Practices for Erosion & Sediment Control

Non-structural practices are those which are not physical, but instead consist of rules, practices, or procedures acquired through policy, planning, or training.

Erosion Control

Non-structural erosion controls to be used at the subject location include the following:

- Minimize disturbance footprint
- Minimize soil compaction in reclaimed areas
- Proper site selection
- Re-vegetation

Sediment Control

Non-structural sediment controls to be used at the subject location include the following:

- Proper site selection
- Routine inspections

Good Housekeeping

Good housekeeping practices must be implemented in order to prevent storm water contamination with solid and liquid wastes generated in the construction process. Good housekeeping practices include but are not limited to employee and contactor training, designating material storage/staging areas, having standard policies and procedures regarding materials handling and waste management, implementing spill prevention procedures, developing spill response and cleanup procedures, and having equipment and vehicle fueling and maintenance policies and procedures.

Training

- Is key to ensuring all employees and contractors understand the importance of good housekeeping and the protection of storm water from pollutant sources

- Ensures all employees and contractors understand the requirements of the storm water plan and associated BMPs
- Ensures all employees and contractors are prepared to identify and respond to an uncontrolled pollutant source
- Facilitates discussion between the owner/construction manager and their employees and contractors

Material Handling and Storage/Staging

- Retain all Safety Data Sheets (SDS) in an accessible location for all stored materials, chemicals, and hydrocarbons
- Do not remove original manufacturer labels
- Keep stored materials, chemicals, and hydrocarbons in original containers or properly designated containers
- Keep bagged and boxed materials on pallets or similar elevated storage area (do not place directly on ground)
- Provide appropriately sized secondary containment or storage containers for applicable materials, chemicals, and hydrocarbons
- Clearly designate delivery and storage areas
- Routinely inspect storage for damaged, leaking, or improperly stored materials, chemicals, or hydrocarbons
- Storage sheds/containers must be leak free
- Minimize storage of materials, chemicals, and hydrocarbons on location (limit to anticipated need in a timely manner)
- Keep well organized and leave adequate room between stored products to facilitate inspection, cleanup, or emergency response actions

Waste Management

- Provide designated containers for trash disposal and recycling (if applicable)
- Ensure all waste containers are covered to prevent storm water contact or wind movement
- Segregate wastes by type for proper disposal
- Ensure all employees and contractors working on location are routinely cleaning the construction site of trash
- Locate waste collection containers near waste sources or at the construction entrance
- Routinely empty waste containers to prevent overfilling

Hazardous Materials and Waste

- If applicable, designate hazardous waste collection area(s)
- Provide adequately sized secondary containment for all hazardous waste storage
- Properly label and handle all hazardous wastes
- Follow company specific waste management guidelines

Sanitary and Septic Waste

- Provide onsite toilet facilities while construction is ongoing
- Locate toilet facilities in convenient locations but away from waterways, wetlands, or other sensitive areas
- All portable toilets must be staked, tied, or otherwise secured to prevent tipping

- Routinely dispose of sanitary and septic waste in accordance with state or local regulations

Equipment/Vehicle Fueling and Maintenance

- Minimize the fueling and maintenance of equipment and vehicles on the construction site
- Only minor unscheduled maintenance should be conducted on location, provided it can be done while protecting storm water
- Routine and major maintenance should be conducted off location
- Keep spill kits/materials on location near on-site fueling and maintenance areas
- Routinely inspect vehicles and equipment for leaks
- All chemical and fuel transfer operations shall be continuously monitored to minimize the risk of spills
- Use absorbent pads, drip pans, or other fluid control measures when drips or spills are possible

Equipment/Vehicle Washing

- Minimize on-site vehicle and equipment washing
- Use off-site dedicated washing facilities when possible
- Keep wash water on location and treat with applicable BMPs
- Do not allow wash water to discharge off of the construction location

Spill Prevention and Response Plan

- Develop a written spill prevention and response plan (may incorporate SPCC plan(s))
- Identify employees and/or contractors responsible for spill prevention and response
- All employees and contractors shall adhere to company specific environmental, health, and safety plans, rules, and programs
- Prioritize employee, contractor, and public safety followed by stopping the source of a spill and containing on-site
- Keep an ample supply of spill cleanup materials and equipment near storage, loading/unloading, and refueling areas
- Adhere to all federal, state, and local rules and regulations for response, cleanup, reporting, and disposal

Other Considerations

Other related BMPs or considerations that indirectly affect erosion and sediment control:

- Implement controls before, during, and after construction as necessary to manage stormwater
- Implement temporary stabilization where construction activities will stop for 14 days or more
- Maintain clearly defined construction boundaries
- Preservation of topsoil for reclamation is key to re-establishing vegetation during the production and abandonment phases
- Preconstruction site selection is important for minimizing the potential for erosion (level/gentle slopes)
- Restriction of livestock access to seeded/reclaimed areas until mature vegetation is established

- Run-on stormwater shall be avoided/mitigated through the use of BMPs including diversion ditches, berms, and dikes
- Slopes steeper than 3:1 on cut and fill areas shall be avoided or minimized where possible (in the event that a 3:1 slope is unavoidable, additional planning and BMPs may be required)

Preventative Maintenance

Preventative maintenance of pipes, pumps, storage tanks, and stormwater management devices to ensure equipment and structures are in good condition and will not pollute stormwater. This includes replacing worn gaskets and valves before leaks occur and removing trash and residue from overflowing containers and receptacles.

Routine Inspections

Routine inspections ensure equipment, machinery, vehicles, and storage tanks are not leaking. Bison employees and contract personnel perform routine visual inspections at all Bison locations.

Inspections

Inspection Frequency

Active Construction Inspections: site inspections shall start within 7 calendar days of the commencement of construction activities at a new site. Inspections will then be conducted either, at least every 7 calendar days, or, at least every 14 calendar days and after precipitation and melting-events that cause surface erosion.

Non-Cropland Sites – Inactive/30-Day Inspections: at sites that are not located in cropland, or, if seed/mulch was used in final stabilization, once all ground disturbing activities have been completed and the location has been pulled-back and has been seeded/mulched (or is awaiting seeding/mulch), and all final stabilization measures have been implemented, the inspection frequency will be reduced to the 30-day/inactive frequency. Inspections will proceed until the site has met CDPHE final stabilization criteria, at which point it will move into the ECMC post-construction stormwater program.

Post-Construction Locations: when the location moves into the ECMC post-construction stormwater program, the location will be inspected at least annually. The inspection frequency may increase if any stormwater issues are found or additional risk factors are identified during future stormwater inspections.

Inspection Scope

At a minimum, the following will be inspected for adequate protection of stormwater and compliance:

- Construction site perimeter
- All disturbed areas
- Designated haul routes
- Material and waste storage areas
- Discharge or potential discharge locations
- Vehicle access locations
- All BMPs

Inspection requirements:

- Visually verify whether all implemented control measures are in effective operational condition and are working as designed in their specifications to minimize pollutant discharges.
    - Determine if there are new potential sources of pollutants.
    - Assess the adequacy of control measures at the site to identify areas requiring new or modified control measures to minimize pollutant discharges.
    - Identify all areas of non-compliance with the permit requirements and, if necessary, implement corrective action(s) in accordance with the general permit (Part I.B.1.c.).

At a minimum, the following information is recorded with each inspection:

- Inspection date
- Names and titles of personnel conducting the inspection
    - Inspector needs to be a Qualified Stormwater Manager (see Section 6.5)
- Weather
- Phase of construction
- Estimate acreage of disturbance
- Location(s) and identification of control measures requiring routine maintenance
- Location(s) and identification of discharges of sediment or other pollutants from the site
- Location(s) and identification of inadequate control measures
- Location(s) and identification of additional control measures needed that were not in place at the time of inspection
- Description of corrective action(s) for previous three items above, dates corrective action(s) were completed, including requisite changes to the SWMP, as necessary
- Description of minimum inspection frequency
- Deviations from inspection schedule
- After adequate corrective action(s) and maintenance have been taken, or where a report does not identify any incidents requiring corrective action or maintenance, the report shall contain the following statement, to be signed by the Qualified Stormwater Manager (QSM):

    I verify that, to the best of my knowledge and belief, that if any corrective action items were identified during the inspection, those corrective actions are complete, and the site is currently in compliance with the permit.

Site Map

Site-specific maps/diagrams are generated for each facility and include the following information at a minimum:

- Construction site boundaries
- Flow arrows that depict stormwater flow directions onsite and runoff direction
- All areas of ground disturbance including cut and fill
- Areas used for storage of soil
- Locations of all waste accumulation
- Locations of dedicated asphalt, concrete batch plants (if applicable)

- Locations of all structural control measures
- Locations of all non-structural control measures
- Locations of springs, streams, wetlands, and other state waters, including areas that requires pre-existing vegetation to be maintained within 50 feet of a receiving water, where determined feasible
- Locations of all stream crossings located within the construction site boundary
- Locations where alternative temporary stabilization schedules apply

Maintenance Procedures for BMPs

The operator is responsible for implementing control measures (inclusive of seeding/mulching and weed mitigation) and performing routine maintenance, as needed, to in ensure BMPs are in effective operating condition. BMPs requiring maintenance are identified in inspection reports and are addressed in the field as soon as practicable.

Training Requirements

The CDPHE general permit does not indicate any specific training or certifications required to manage a stormwater program/project or conduct inspections. The permit does, however, indicate that the person designated as responsible for implementing the SWMP, and the persons responsible for conducting inspections, need to meet the definition of a Qualified Stormwater Manager (QSM). A QSM is defined as an individual knowledgeable in the principles and practices of erosion and sediment control and pollution prevention, and with the skills to assess conditions at construction sites that could impact stormwater quality and to assess the effectiveness of stormwater controls implemented to meet the requirements of the permit. The person responsible for implementing the SWMP at the subject location, and all stormwater inspectors are QSMs.

Reporting and Recordkeeping Requirements

Copies of documentation required by the CDPHE general permit, including records of all data used to complete the application for permit coverage, must be retained for at least three years from the date that permit coverage expires or is terminated.

Summary of Best Management Practices (BMPs)

The following is a list of minimization and mitigation BMPs related to Bison's stormwater management plan and approach at the subject location. ECMC clarified in a previous submission that this list should only include *physical* sediment or erosion control BMPs that will be employed on location (no non-structural BMPs or non-physical practices, etc.).

- Culvert – Culverts will be used along the perimeter ditch under the access road at the entrance to the pad.
- Ditch/drainage swale – Ditches will be used in conjunction with berms as perimeter control around the disturbance.
- Earth dike/berm – Berms will be used in conjunction with ditches as perimeter control around the disturbance.

- Mulching – Mulching will be used in conjunction with seeding at the subject location during interim reclamation on all reclaimed areas that cannot be feasibly returned to farmland or where the landowner chooses not to incorporate a part of the reclamation into the surrounding field, and on the topsoil pile to achieve permanent stabilization.
- Rip-rap/rock armor – Riprap will be used to armor the emergency spillway in the retention pond located on the eastern side of the pad.
- Sediment basin/retention pond – A retention pond will be implemented along the eastern perimeter of the subject location.
- Seeding – All areas that cannot be feasibly be returned to landowner for agricultural-use or where the landowner chooses not to incorporate a part of the reclamation into the surrounding field will be seeded during interim reclamation. Seeding will also be applied to the topsoil pile to achieve permanent stabilization.
- Seed mix – The seed mix was selected from the Arapahoe County Grading, Erosion, and Sediment Control Manual. The seed mix consists of 10% western wheatgrass, 10% Canada wildrye, 10% needle and thread, 10% big bluestem, 10% slender wheatgrass, 10% Indian grass, 10% sideoats grama, 10% blue grama, 10% sand dropseed, 5% thickspike wheatgrass and 5% streambank wheatgrass. The prescribed application rate is 15.5 pounds per acre.
- Stormwater within secondary containment – Stormwater that accumulates within secondary containment will be monitored and removed on an as-needed basis. If stormwater is free of hydrocarbons, it will be pumped into perimeter stormwater BMPs for filtration before discharging offsite. If hydrocarbons are present, stormwater will be removed and sent to a registered disposal facility.
- Surface armor – Surface armor will be utilized on all working pad surfaces at the subject location.
- Surface roughening/cat-tracking – Surface roughening/cat-tracking will be used as a temporary stabilization BMP at the topsoil stockpile.

Appendix A – Stormwater Management Plan Maps

- Initial Construction SWMP Overview Map
- Construction Layout Drawings
  - Construction Layout/Grading Plan
  - Completion Layout
  - Facility Layout (Production)
  - SWMP Map (Construction)
  - Interim Reclamation Layout/Interim SWMP Map
- Soils/Erosion Maps
- Pre-Disturbance Land Use Map
- Pre-Disturbance Vegetation Identification/Analysis and Photo Series

BISON IV OPERATING

Stormwater Management Plan Overview Map

Remora Pad

N W E S

0 1,100 2,200

Feet

Scale: 1:10,000

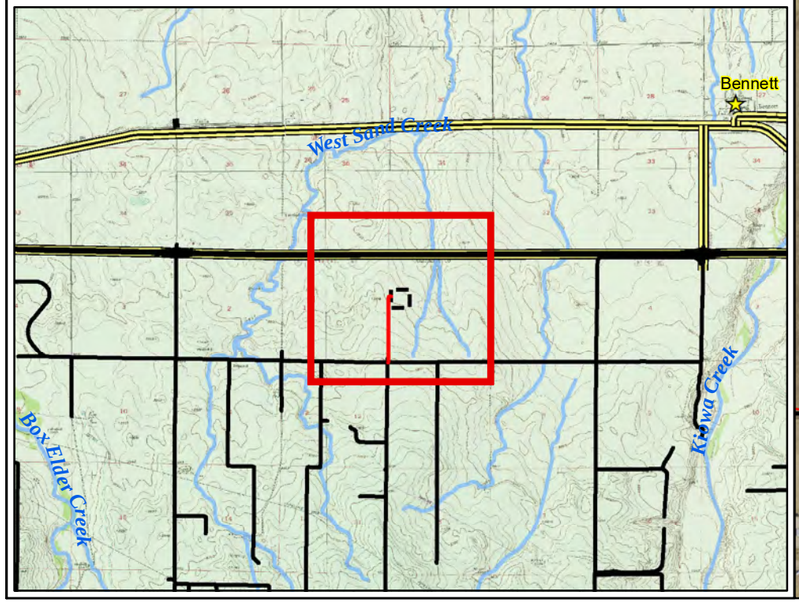
Prepared by:

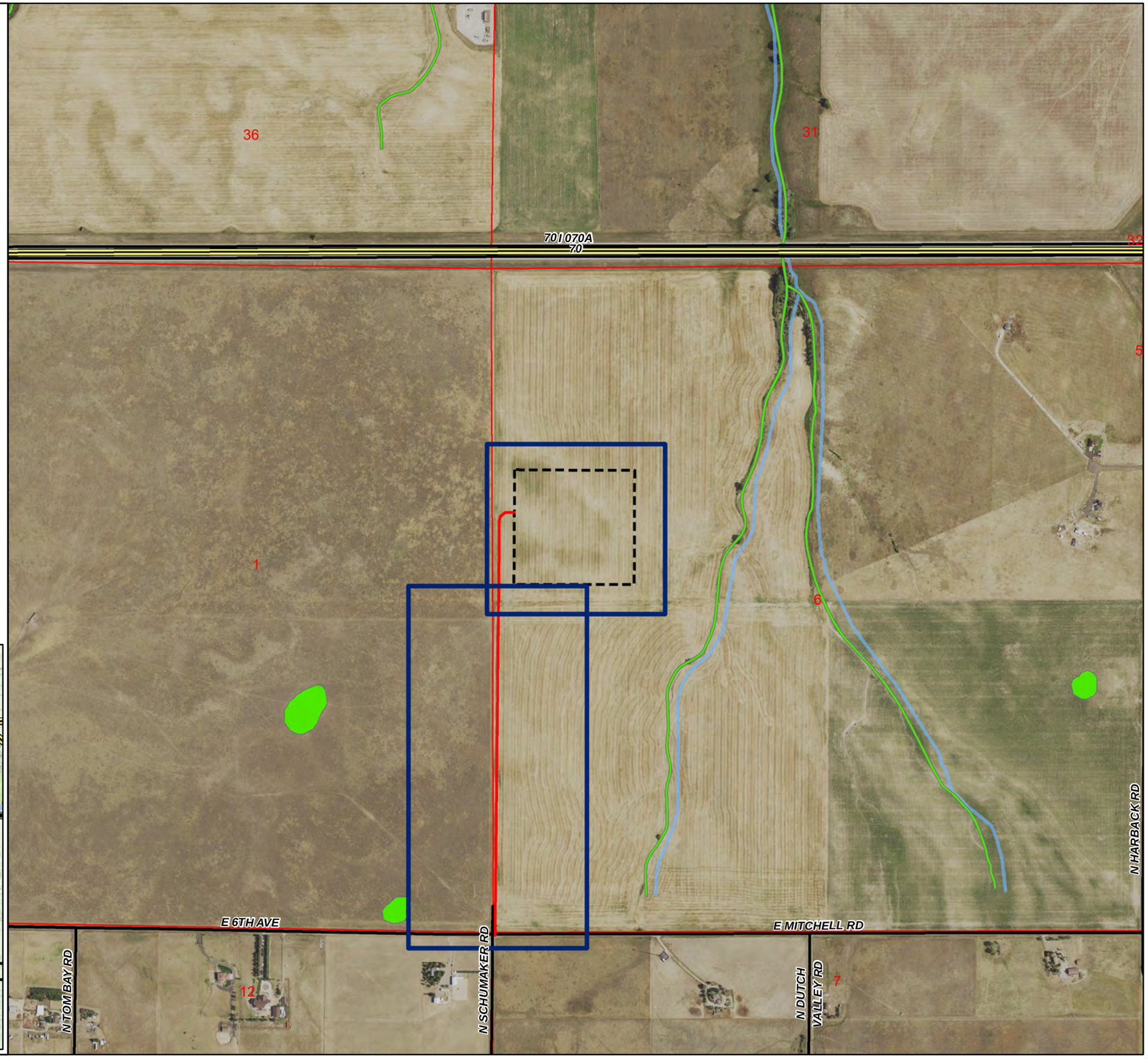
Editor: nwilson

Date: 9/13/2023

File: BOG_PreConstr_Overview_V1

- Construction Boundary
- Access Road
- County/Local Road
- Highway
- Waterbody
- Waterway
- Wetland
- Sections





PAD CONSTRUCTION NOTE:
All cut end slopes are to be at 4:1 slopes &
All fill end slopes are to be at 4:1 slopes

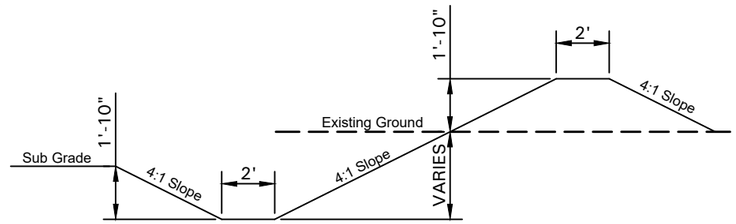
Remora 6 Pad
Construction Layout

	Well Name	Existing Elevation	Cut/Fill
A	Blink 4-63 6-32-1	5602.8'	C 3.5'
B	Blink 4-63 6-32-2	5602.9'	C 3.6'
C	Blink 4-63 6-32-3	5603.0'	C 3.7'
D	Blink 4-63 6-32-4	5603.1'	C 3.8'
E	Blink 4-63 6-32-5	5603.3'	C 4.0'
F	Chili Pepper 4-63 6-4-1	5603.4'	C 4.1'
G	Chili Pepper 4-63 6-4-2	5603.6'	C 4.3'
H	Chili Pepper 4-63 6-4-3	5603.8'	C 4.5'
I	Chili Pepper 4-63 6-4-4	5602.2'	C 2.9'
J	Chili Pepper 4-63 6-4-5	5602.3'	C 3.0'
K	Chili Pepper 4-63 6-4-6	5602.4'	C 3.1'
L	Foo Fighter 4-63 6-8-1	5602.5'	C 3.2'
M	Foo Fighter 4-63 6-8-2	5602.6'	C 3.3'
N	Foo Fighter 4-63 6-8-3	5602.9'	C 3.6'
O	Foo Fighter 4-63 6-8-4	5603.2'	C 3.9'
P	Foo Fighter 4-63 6-8-5	5603.6'	C 4.3'

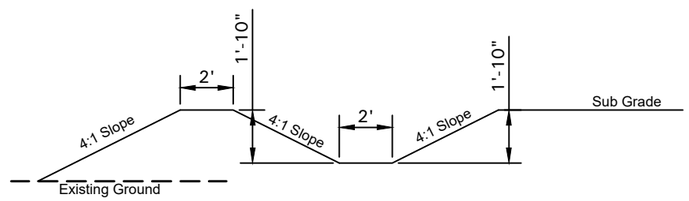
Pad Quantities

Cut Volume	46,375 C.Y.
Minus Fill Volume	37,445 C.Y.
Minus Stockpile Topsoil (7")	14,000 C.Y.
Plus Retention Pond	6,405 C.Y.
Net Excess	1,335 C.Y.
Proposed Drilling Pad	11.8 Acres
Disturbed Area From Pad	14.87 Acres

NOTE:
The drawings presented herein are based upon third-party survey data of existing utilities and features. KLJ cannot attest to the accuracy of this information.



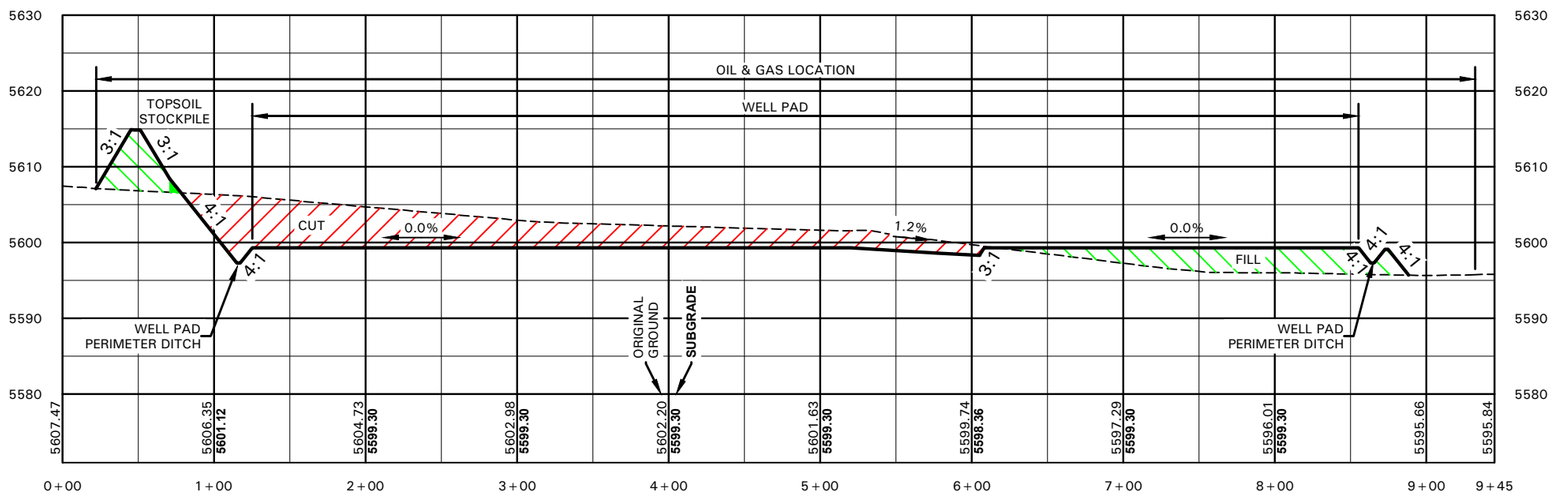
Typical Cut Section



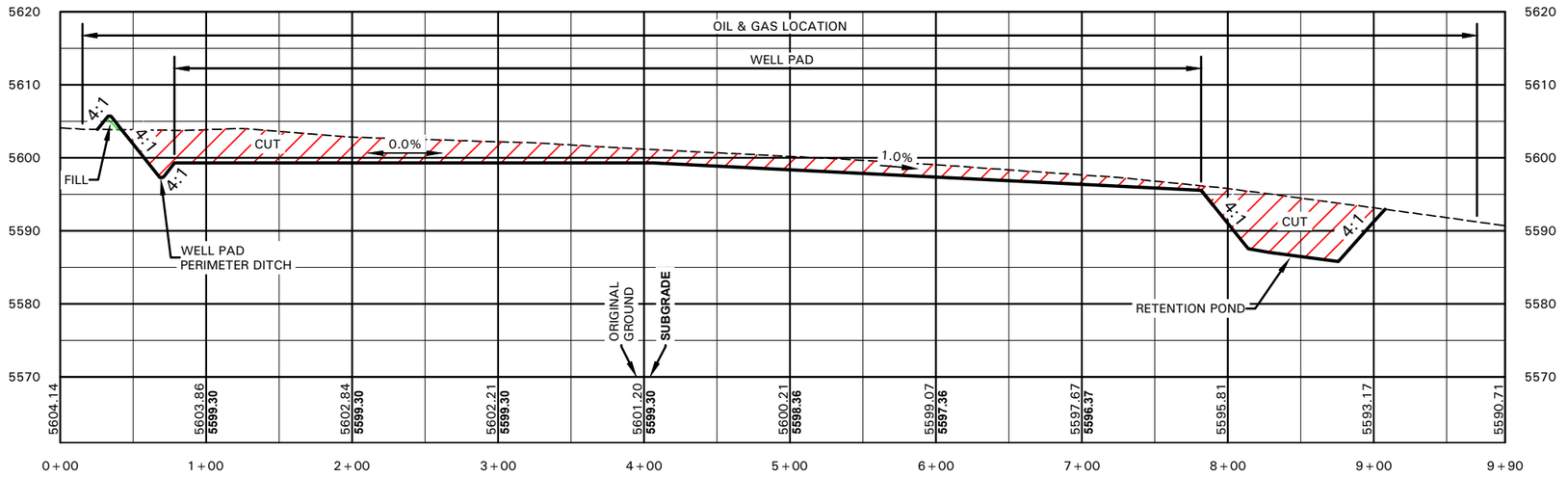
Typical Fill Section

Computed & Drawn By	J. Kress
Date	8/22/2023
Approved By	M. Kenney
Project No.	2324_01280
Revised	-

Remora 6 Pad
Well/Facilities Pad Profiles



SECTION A-A



SECTION B-B

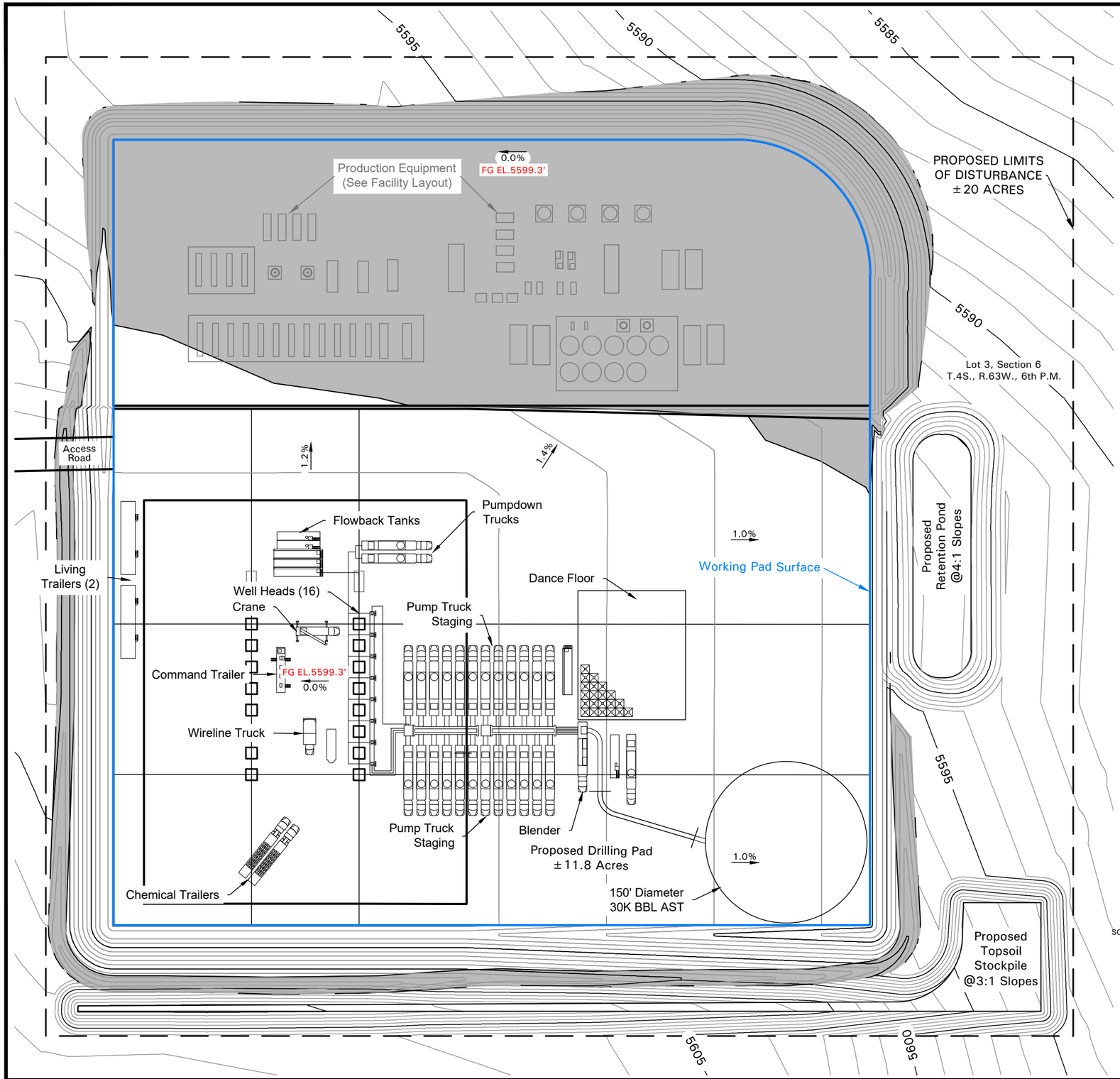
PROFILE LEGEND	
SYMBOL	ITEM
- - - - - -	ORIGINAL GROUND
———	SUBGRADE

50 0 50 100
scale HORIZONTAL SCALE feet

10 0 10 20
scale VERTICAL SCALE feet

Approved By	M. Kenney
Date	8/22/2023
Revised	-
Computed & Drawn By	J. Kress
Project No.	2324_01280

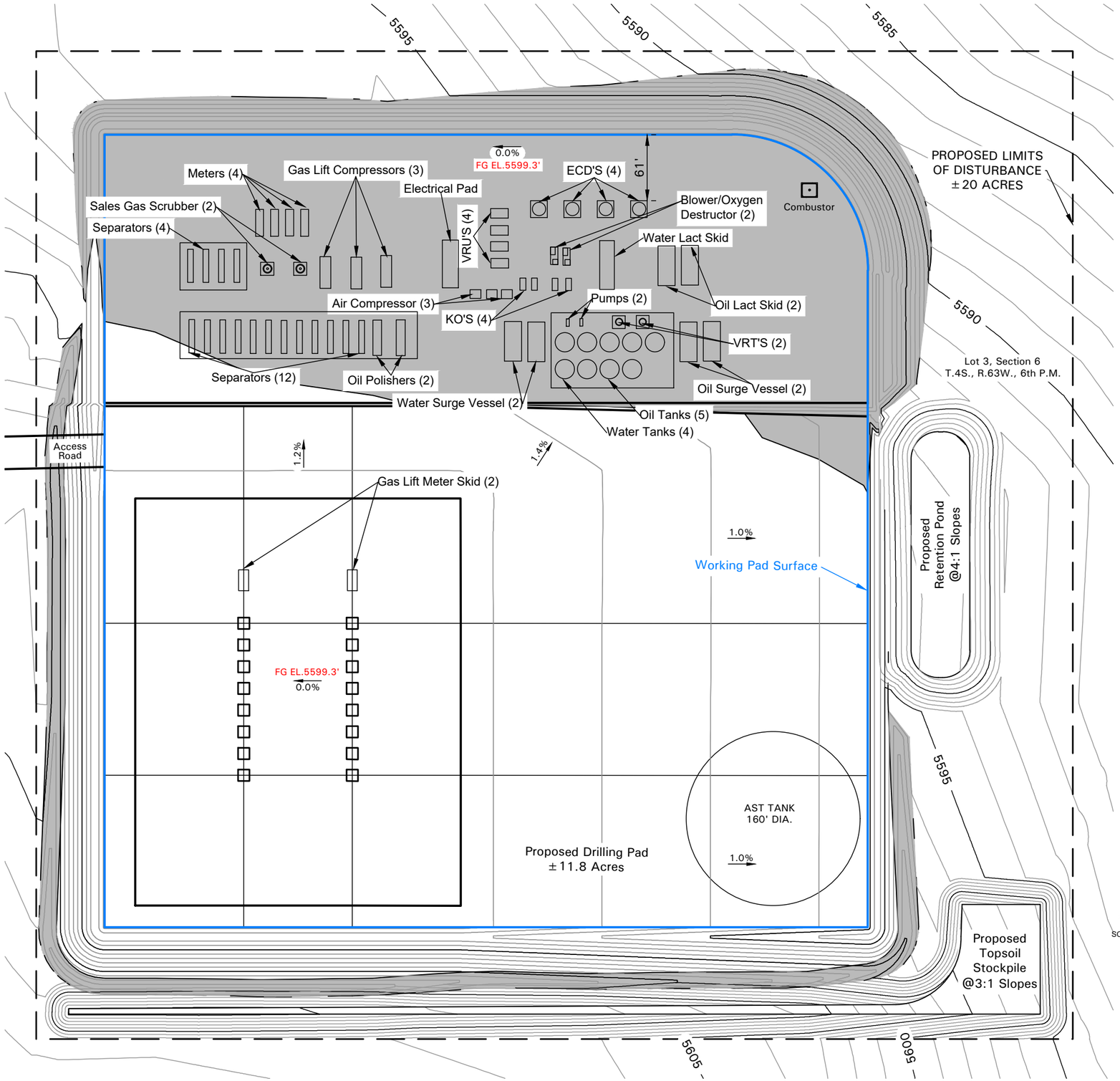
Remora 6 Pad
Completions Layout



Computed & Drawn By	Approved By
J. Kress	M. Kenney
Project No.	**Date**
2324_01280	8/22/2023
	Revised
	-

NOTE:
The drawings presented herein are based upon third-party survey data of existing utilities and features. KLJ cannot attest to the accuracy of this information.

Remora 6 Pad
Facility Layout



Approved By	Date	Revised
M. Kenney	8/22/2023	-

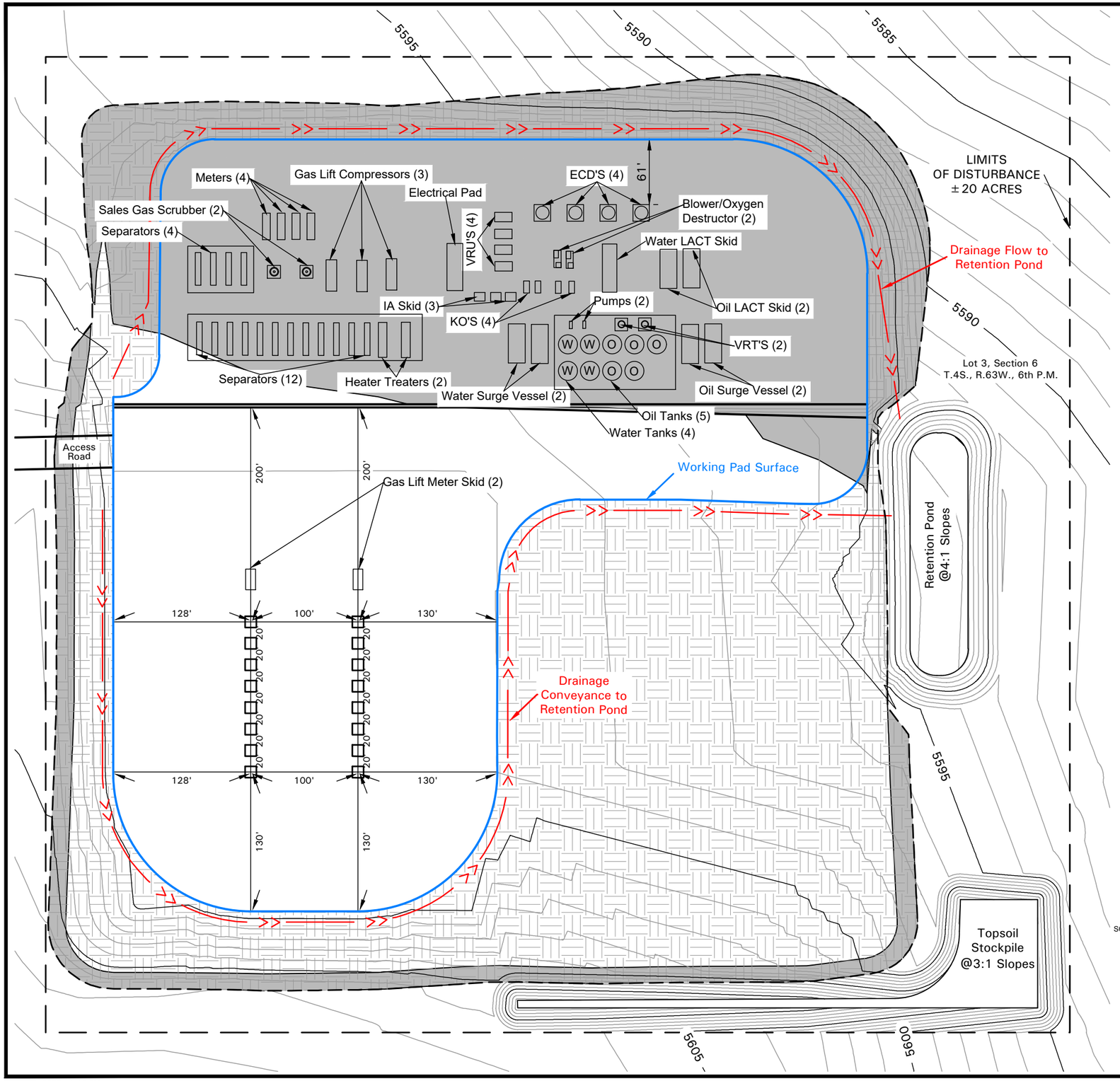
Computed & Drawn By	Project No.
J. Kress	2324_01280

NOTE:
The drawings presented herein are based upon third-party survey data of existing utilities and features. KLJ cannot attest to the accuracy of this information.

BISON OIL & GAS IV

KLJ

Remora 6 Pad
Interim Reclamation Layout



Pad Quantities

Cut Volume	**13,100 C.Y.**
Minus Fill Volume	**4,240 C.Y.**
Net Excess	**8,860 C.Y.**
Limits of Disturbance	**20.00 Acres**
Unreclaimed Area	**9.52 Acres**
Reclaimed Area	**10.48 Acres**

LEGEND

Reclaimed Area

N

SCALE 50 0 50 100 FEET

Approved By	
M. Kenney	
Date	**Revised**
9/27/2023	-
Computed & Drawn By	**Project No.**
J. Kress	2324_01280

NOTE:
The drawings presented herein are based upon third-party survey data of existing utilities and features. KLJ cannot attest to the accuracy of this information.

BISON IV OPERATING

Stormwater Management Construction Plan Site Map

Remora Pad

Prepared by:

N W E S

0 200 400

Feet

Editor: nwilson

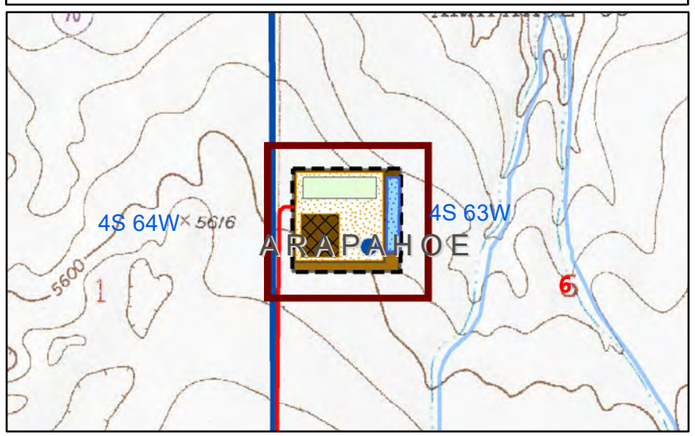
File: BOG_Construction_V1

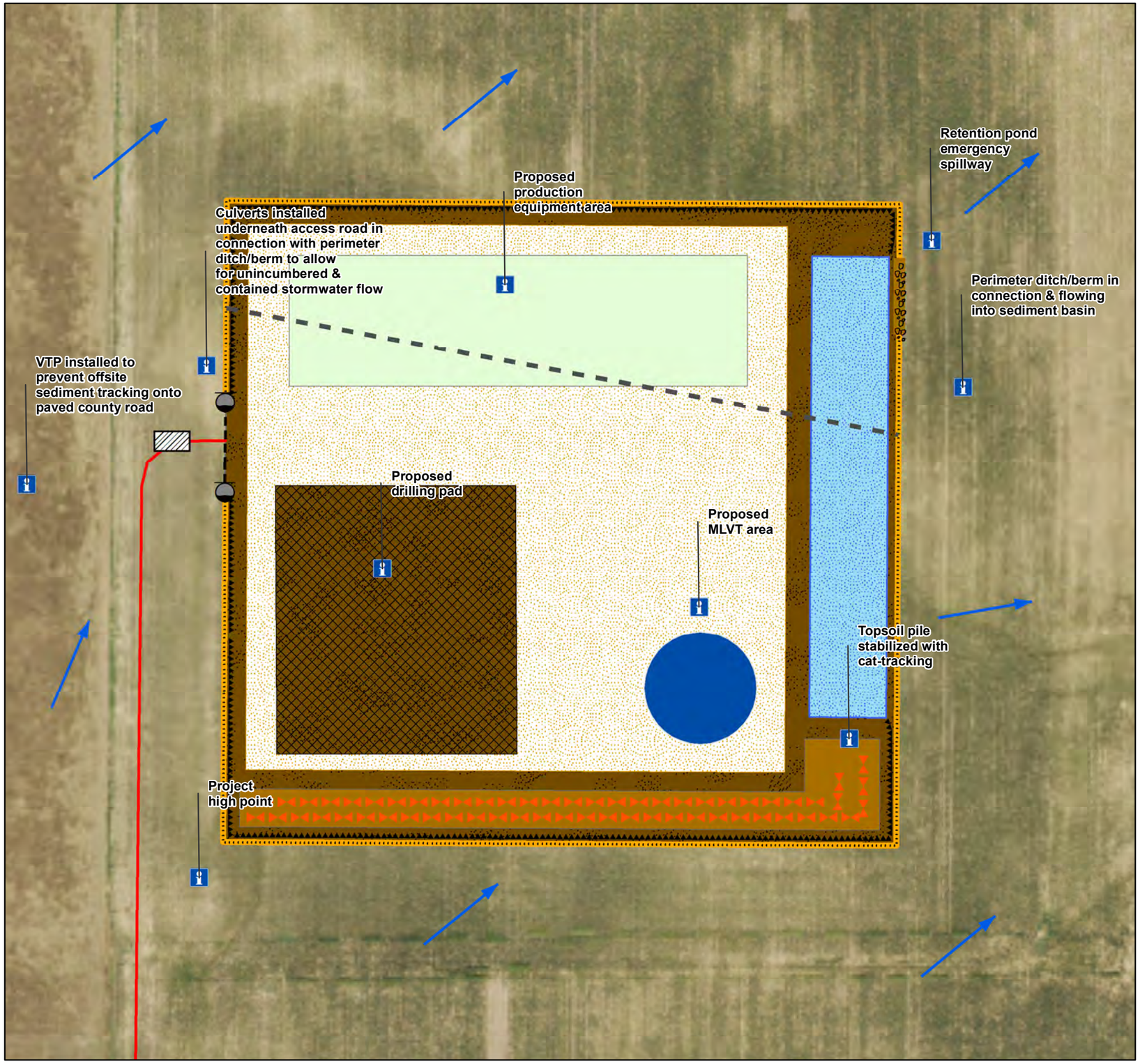
Scale:1:1,800

Date: 9/29/2023

- Vehicle Track Pad
- Culvert w/Armor
- Information
- Cat Tracking
- Diversion Ditch
- Earthen Berm
- Riprap
- Cut/Fill
- Flow
- Access Road
- Construction Boundary
- Equipment
- Disturbance
- MLVT
- Pad Drilling (Road Base)
- Pad Drillling
- Retention Pond
- Topsoil

Note: Only disturbance boundary is to scale, all other diagram features are for representative purposes only.





BISON IV OPERATING

Stormwater Management Construction Plan Site Map

Remora Pad

Prepared by:

N W E S

0 425 850

Feet

Editor: nwilson

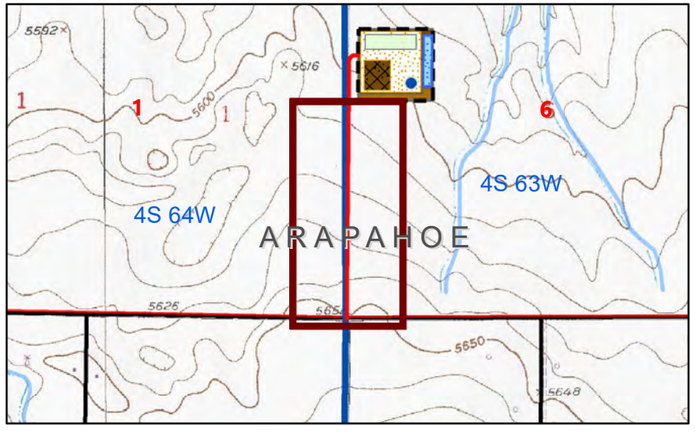
File: BOG_Construction_V1

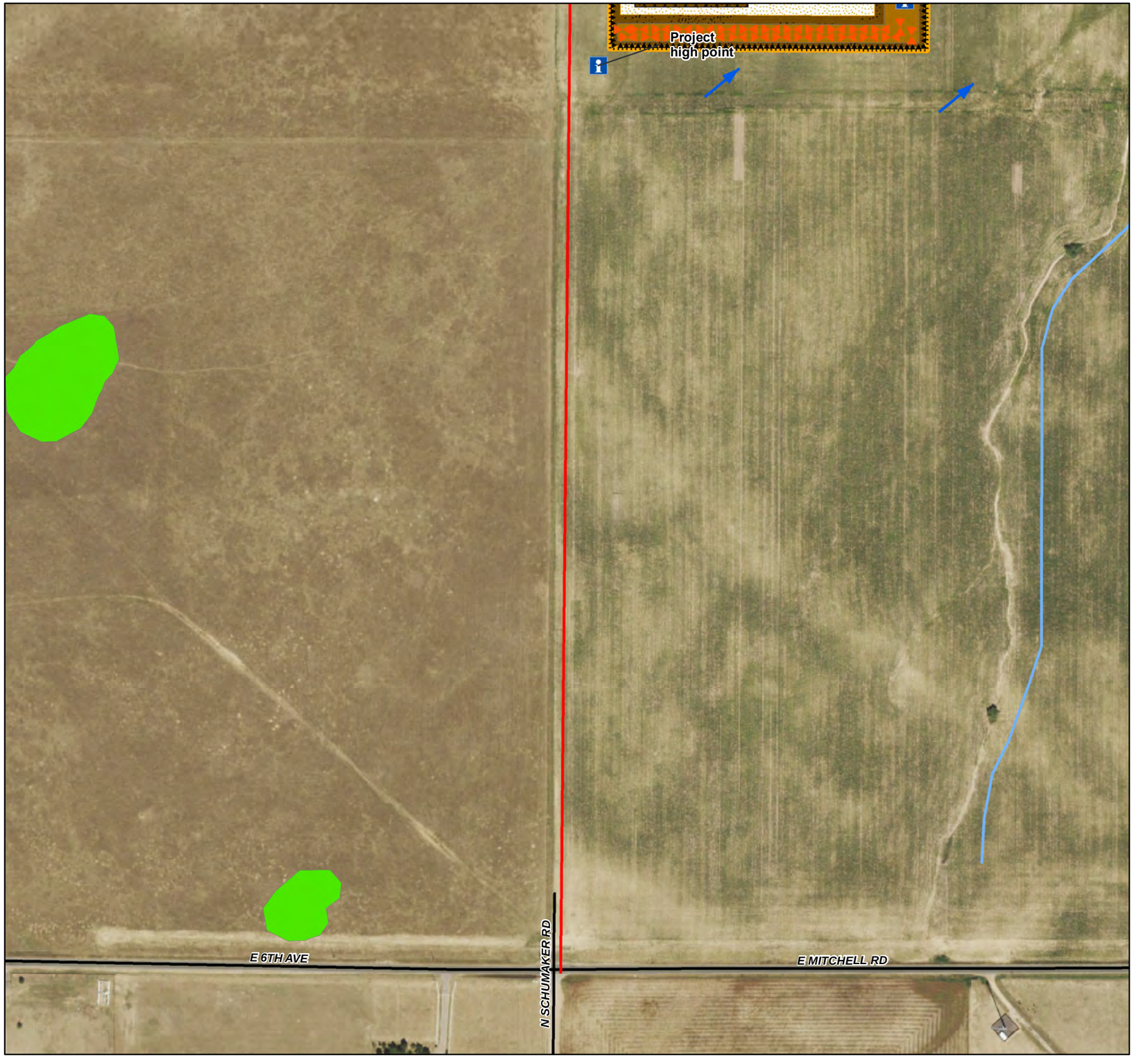
Scale:1:3,800

Date: 9/29/2023

- Information
- Cat Tracking
- Diversion Ditch
- Earthen Berm
- Flow
- Access Road
- Construction Boundary
- Disturbance
- Pad Drilling (Road Base)
- Pad Drillling
- Topsoil
- NHD Waterway
- Wetland
- Major Roads

Note: Only disturbance boundary is to scale, all other diagram features are for representative purposes only.





BISON IV OPERATING

Stormwater Management Plan
Soils Map

Remora Pad

Prepared by:

Date: 9/13/2023

0 0.325 0.65

Miles

1:20,470

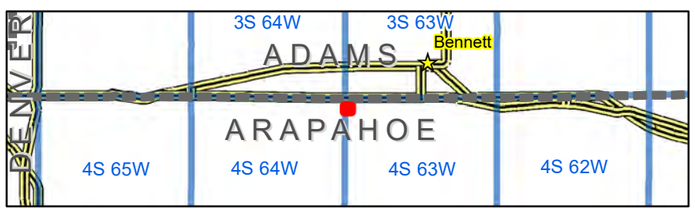
- Access Road
- Area of Potential Impact
- Major Roads
- Highway
- NHD Flowline
- Wetland

Map Unit Name:

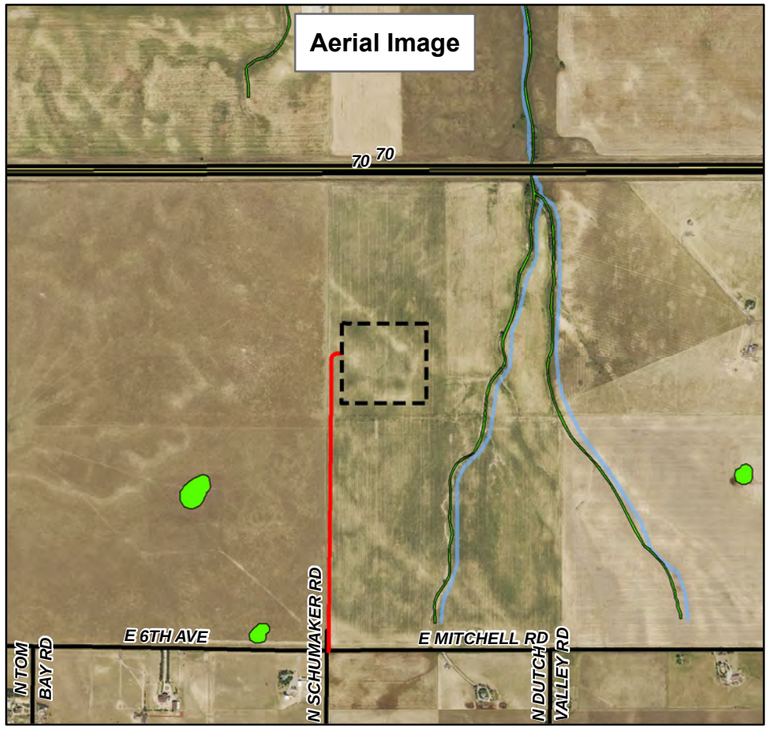
- Bresser and Truckton soil, 3 to 9 slopes, eroded
- Bresser-Truckton sandy loams, 3 to 5 percent slopes
- Bresser-Truckton sandy loams, 5 to 20 percent slopes
- Nunn-Bresser-Ascalon complex, 0 to 3 percent slopes
- Renohill loam, 3 to 9 percent slopes
- Truckton loamy sand, 5 to 20 percent slopes
- Weld-Deertrail silt loams, 0 to 3 percent slopes
- Adena loam, 0 to 3 percent slopes
- Ascalon sandy loam, 0 to 3 percent slopes
- Ascalon sandy loam, 3 to 5 percent slopes
- Ascalon sandy loam, 5 to 9 percent slopes
- Ascalon-Vona sandy loams, 1 to 5 percent slopes
- Renohill loam, 3 to 9 percent slopes
- Truckton loamy sand, 3 to 9 percent slopes
- Vona loamy sand, 3 to 9 percent slopes
- Weld loam, 1 to 3 percent slopes

K Factor Value Groupings (Approximate):

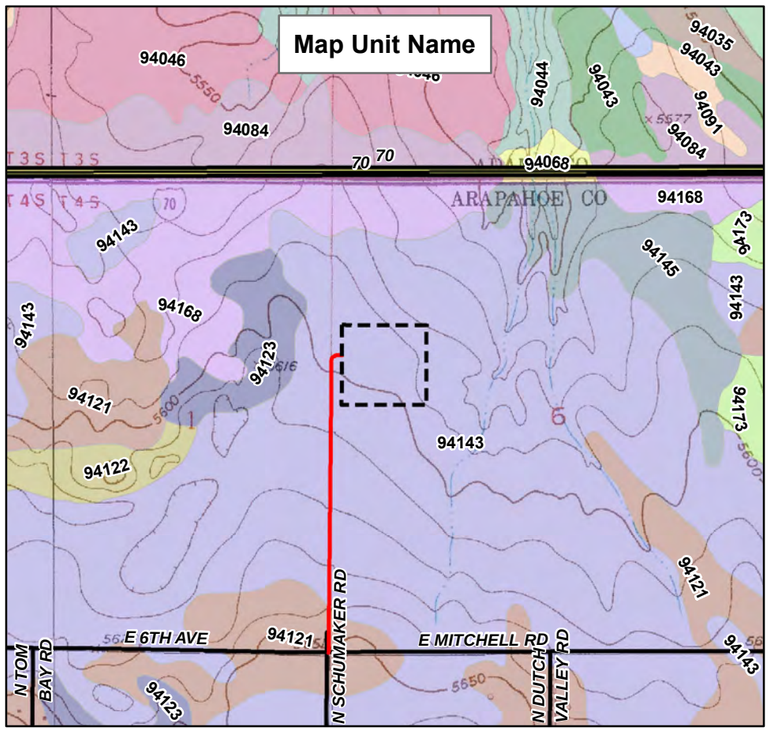
Low susceptibility to erosion/runoff: ≤ 0.2
Moderate susceptibility to erosion/runoff: > 0.2 - 0.4
High susceptibility to erosion/runoff: > 0.4

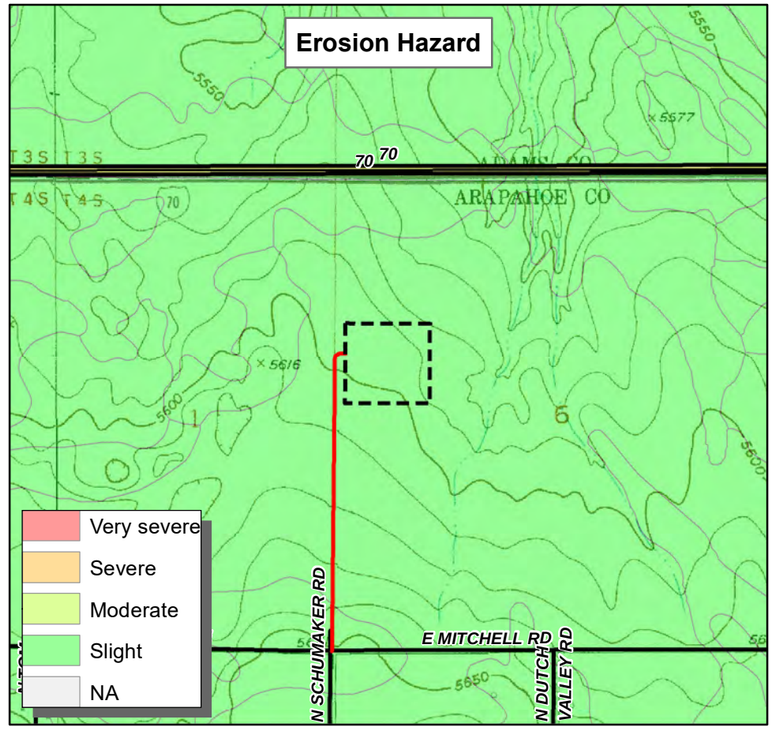


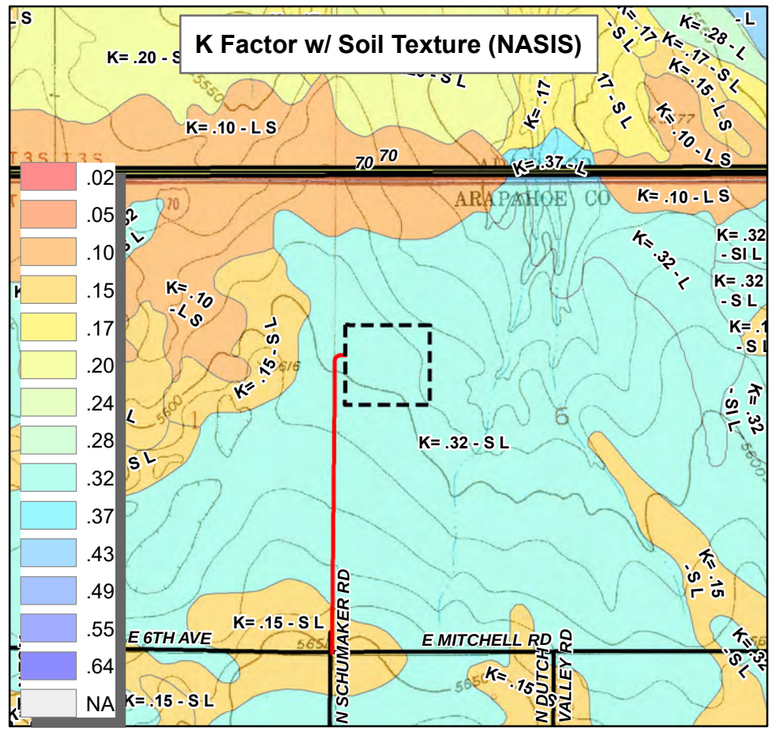
Document Name: BOG_Soils_V2 User Name: nwilson



All data is from the NRCS soil surveys and is useful for overview purposes only. Onsite verifications are required to confirm accuracy when used for planning.







BISON IV OPERATING

Stormwater Management Plan Land Use Map

Remora Pad

N W E S

0 875 1,750

Feet

Scale: 1:8,080

Prepared by:

Editor: nwilson

Date: 9/13/2023

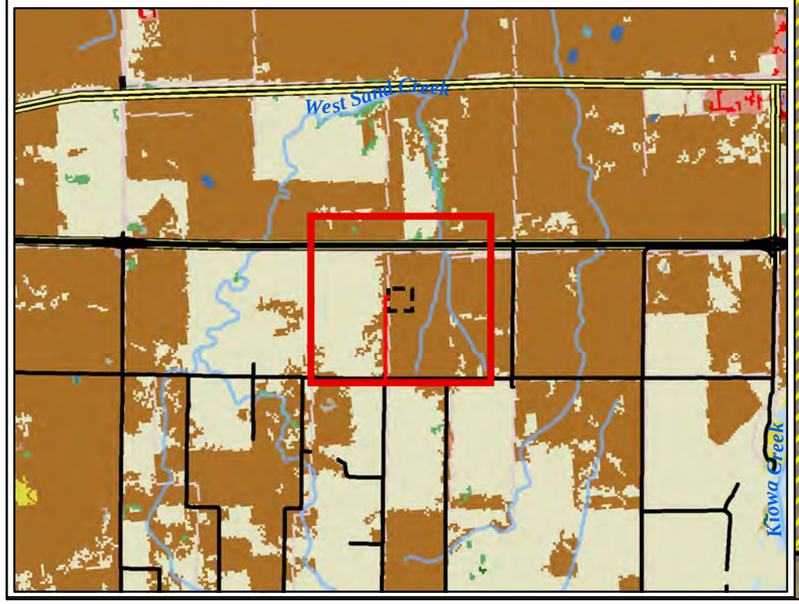
File: BOG_Land_Use_V1

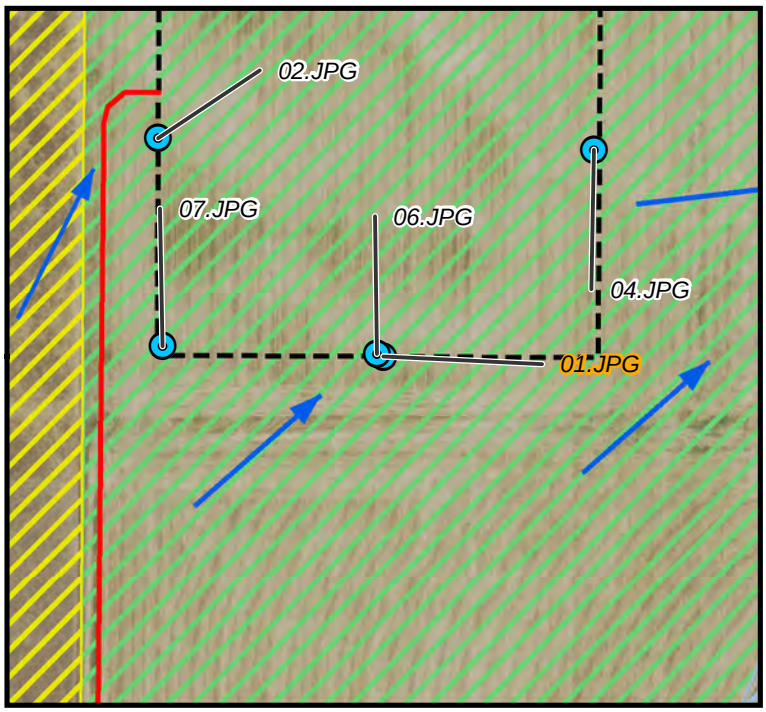
Main Map (H2E Gathered Data)

- Photo Point
- Flow
- Access Road
- Construction Boundary
- Residential/Commercial
- Cropland
- Disturbed Grassland
- Riparian
- Major Roads
- Highway
- Waterway
- Wetland

Inset Map (National Land Cover Data)

- Barren Land
- Cultivated Crops
- Deciduous Forest
- Developed, High Intensity
- Developed, Low Intensity
- Developed, Medium Intensity
- Developed, Open Space
- Emergent Herbaceuous Wetlands
- Evergreen Forest
- Hay/Pasture
- Herbaceuous
- Mixed Forest
- Open Water
- Perennial Snow/Ice
- Shrub/Scrub
- Woody Wetlands





BISON IV OPERATING

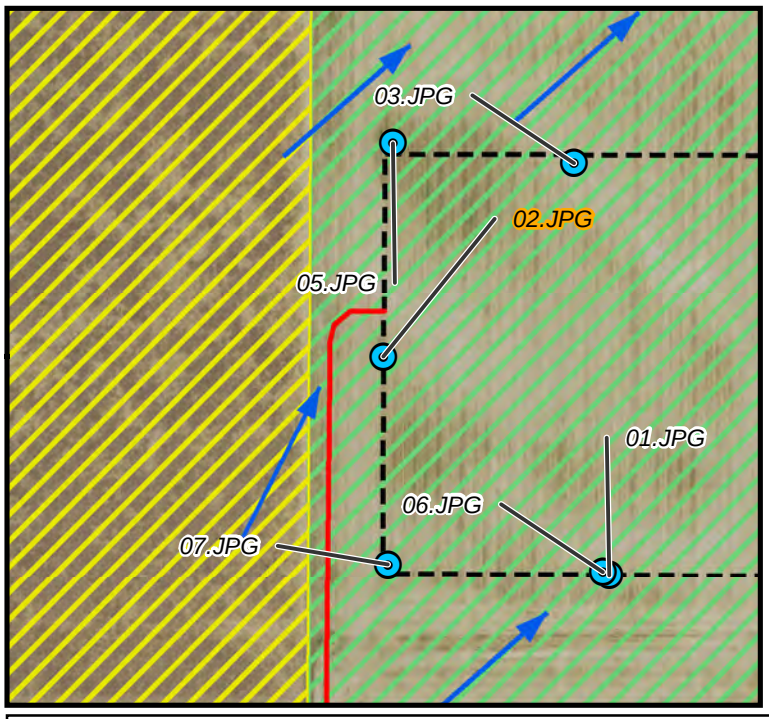
Stormwater Management Plan Map

01.JPG Remora Pad

D_WGS_1984: 39.731090 -104.487200

- Photo Point
- Riparian
- Flow
- Access Road
- Construction Boundary
- Cropland
- Disturbed Grassland

Photo taken facing N at the S end of the future construction boundary across a recently harvested agriculture field.



BISON IV OPERATING

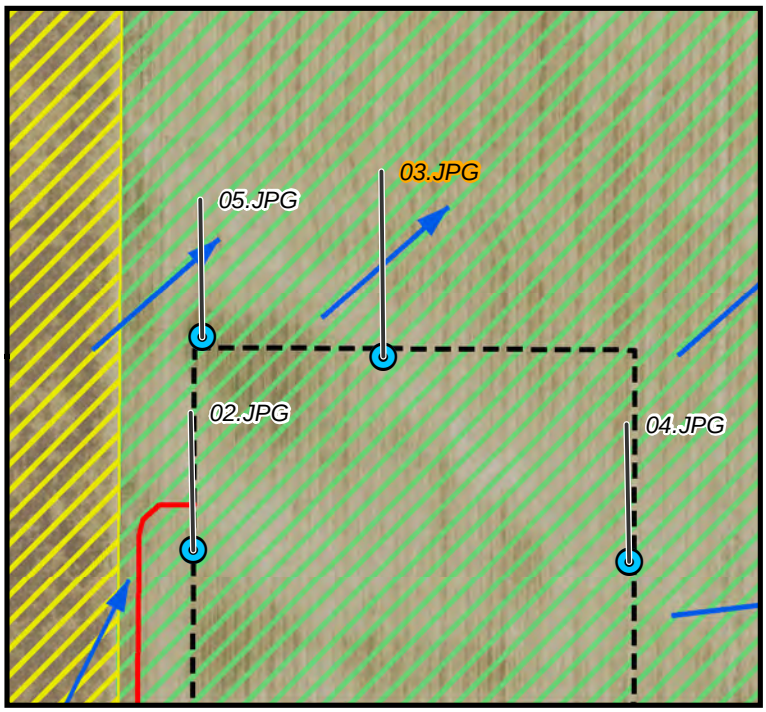
Stormwater Management Plan Map

02.JPG Remora Pad

D_WGS_1984: 39.732400 -104.488900

- Photo Point
- Flow
- Access Road
- Construction Boundary
- Cropland
- Disturbed Grassland

Photo taken facing E at the W edge of the proposed disturbance boundary near the future access road across a recently harvested agriculture field.



BISON IV OPERATING

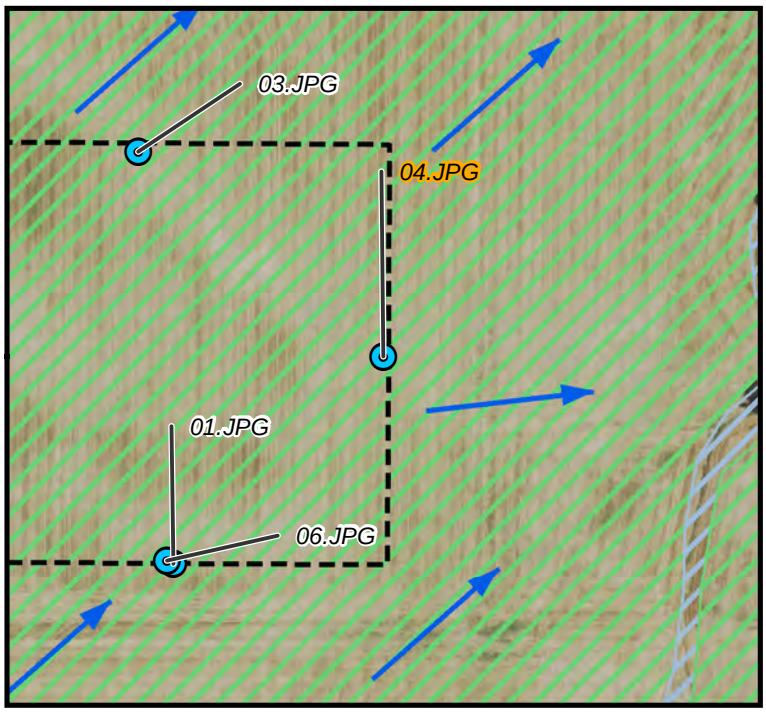
Stormwater Management Plan Map

03.JPG Remora Pad

D_WGS_1984: 39.733550 -104.487500

- Photo Point
- Flow
- Access Road
- Construction Boundary
- Cropland
- Disturbed Grassland

Photo taken facing S at the N end of the future construction boundary across a recently harvested agriculture field.



BISON IV OPERATING

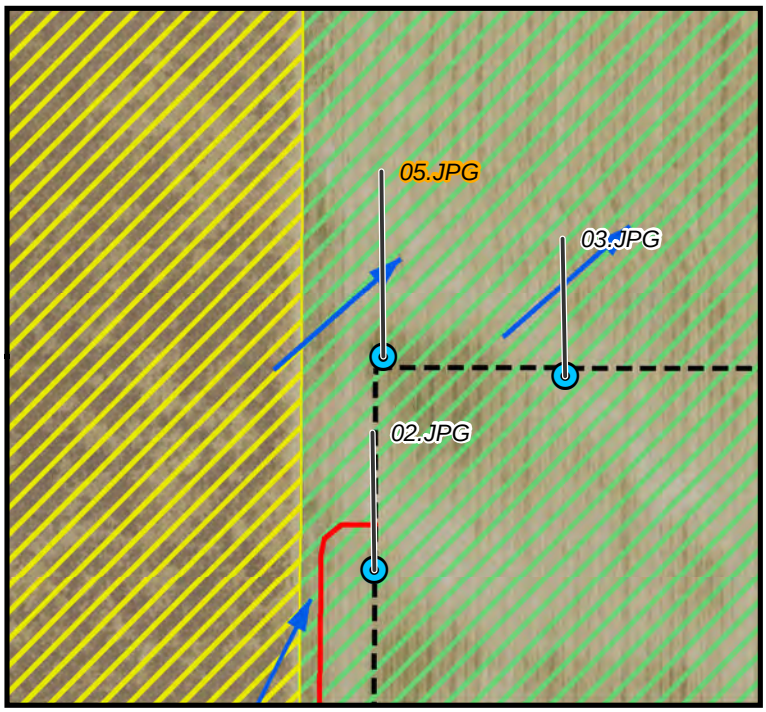
Stormwater Management Plan Map

04.JPG Remora Pad

D_WGS_1984: 39.732320 -104.485600

- Photo Point
- Flow
- Construction Boundary
- Cropland
- Riparian

Photo taken facing W at the E edge of the propose pad boundary across a recently harvested agriculture field.



BISON IV OPERATING

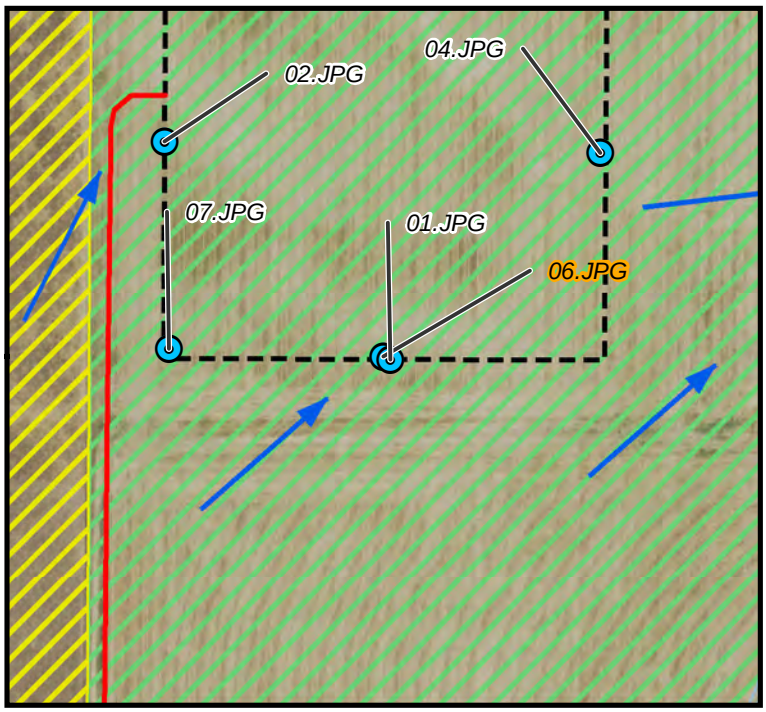
Stormwater Management Plan Map

05.JPG Remora Pad

D_WGS_1984: 39.733670 -104.488900

- Photo Point
- Flow
- Access Road
- Construction Boundary
- Cropland
- Disturbed Grassland

Photo taken facing SE at the NW corner of the future disturbance boundary across the proposed disturbance giving an overview of the pre-disturbance land conditions.



BISON IV OPERATING

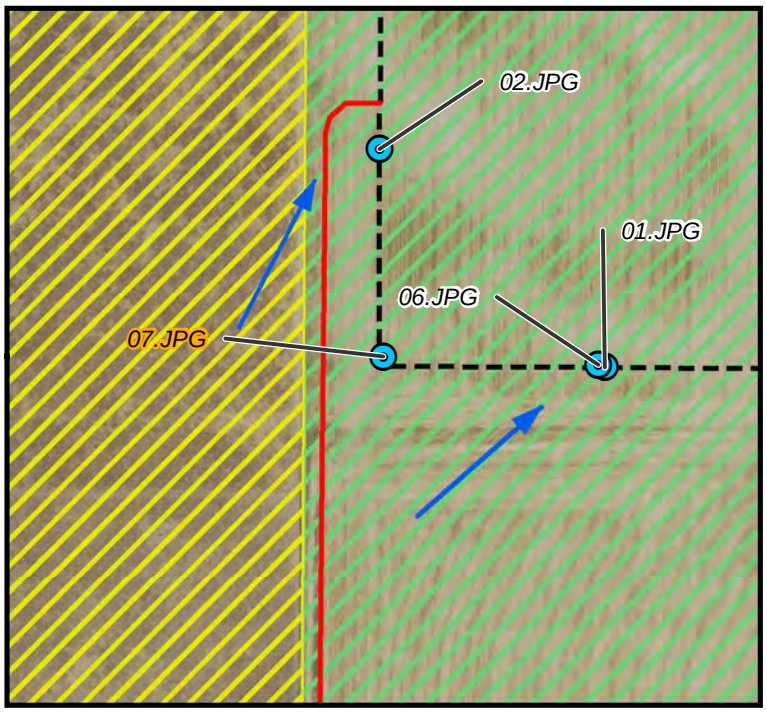
Stormwater Management Plan Map

06.JPG Remora Pad

D_WGS_1984: 39.731110 -104.487300

- Photo Point
- Riparian
- Flow
- Access Road
- Construction Boundary
- Cropland
- Disturbed Grassland

Photo taken facing S at the S edge of the future pad boundary across the same recently harvested agriculture field that the proposed disturbance will share. This photo can be used for reference during interim and final reclamation operations for original land use conditions.



BISON IV OPERATING

Stormwater Management Plan Map

07.JPG Remora Pad

D_WGS_1984: 39.731160 -104.488900

- Photo Point
- Flow
- Access Road
- Construction Boundary
- Cropland
- Disturbed Grassland

Photo taken facing NE at the SW corner of the future pad boundary facing downslope from the projects high point.

Appendix B – Soils Reports

Arapahoe County, Colorado

BvC—Bresser-Truckton sandy loams, 3 to 5 percent slopes

Map Unit Setting

National map unit symbol: 34y5
Elevation: 4,500 to 6,800 feet
Mean annual precipitation: 12 to 18 inches
Mean annual air temperature: 46 to 52 degrees F
Frost-free period: 125 to 180 days
Farmland classification: Prime farmland if irrigated and the product of I (soil erodibility) x C (climate factor) does not exceed 60

Map Unit Composition

Bresser and similar soils: 55 percent
Truckton and similar soils: 30 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Bresser

Setting

Landform: Playas, drainageways, stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Noncalcareous sandy alluvium and/or noncalcareous sandy eolian deposits

Typical profile

H1 - 0 to 6 inches: sandy loam
H2 - 6 to 26 inches: sandy clay loam
H3 - 26 to 32 inches: gravelly sandy loam
H4 - 32 to 60 inches: gravelly loamy coarse sand

Properties and qualities

Slope: 3 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Available water supply, 0 to 60 inches: Moderate (about 6.7 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Ecological site: R049XB210CO - Sandy Foothill
Hydric soil rating: No

Description of Truckton

Setting

Landform: Ridges
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Eolian deposits

Typical profile

H1 - 0 to 5 inches: sandy loam
H2 - 5 to 20 inches: sandy loam
H3 - 20 to 60 inches: sandy loam

Properties and qualities

Slope: 3 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 6.0 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: A
Ecological site: R049XB210CO - Sandy Foothill
Hydric soil rating: No

Minor Components

Nunn

Percent of map unit: 8 percent
Hydric soil rating: No

Ascalon

Percent of map unit: 7 percent
Hydric soil rating: No

NrB—Nunn-Bresser-Ascalon complex, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 34yw
Elevation: 4,500 to 6,800 feet
Mean annual precipitation: 12 to 18 inches
Mean annual air temperature: 46 to 57 degrees F
Frost-free period: 115 to 180 days

Farmland classification: Prime farmland if irrigated

Map Unit Composition

Nunn and similar soils: 40 percent
Bresser and similar soils: 25 percent
Ascalon and similar soils: 20 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Nunn

Setting

Landform: Playas, streams, stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Eolian deposits

Typical profile

H1 - 0 to 8 inches: loam
H2 - 8 to 28 inches: clay
H3 - 28 to 60 inches: sandy clay loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 8.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3c
Hydrologic Soil Group: C
Ecological site: R049XB202CO - Loamy Foothill
Hydric soil rating: No

Description of Bresser

Setting

Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Noncalcareous sandy alluvium and/or noncalcareous sandy eolian deposits

Typical profile

H1 - 0 to 6 inches: sandy loam
H2 - 6 to 26 inches: sandy clay loam
H3 - 26 to 60 inches: gravelly loamy coarse sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Available water supply, 0 to 60 inches: Moderate (about 6.4 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 4c
Hydrologic Soil Group: B
Ecological site: R049XB202CO - Loamy Foothill
Hydric soil rating: No

Description of Ascalon

Setting

Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Reworked by wind outwash

Typical profile

H1 - 0 to 6 inches: sandy loam
H2 - 6 to 17 inches: sandy clay loam
H3 - 17 to 60 inches: fine sandy loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 6.7 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: R049XB202CO - Loamy Foothill
Hydric soil rating: No

Minor Components

Olney

Percent of map unit: 10 percent

Hydric soil rating: No

Aquic ustochrepts

Percent of map unit: 5 percent
Landform: Swales
Hydric soil rating: Yes