Appendix A – Recommended Mitigation Measures

Biological Resources

BIO-1: The Applicant shall ensure that prior to and during construction, onsite occupied burrows shall be avoided during nesting season (February 1 through August 31).

BIO-2: The Applicant shall conduct a preconstruction survey within 30 days of ground-breaking activities to identify any burrowing owls on site.

BIO-3: If burrowing owls are found within the Project site, a Burrowing Owl Mitigation Plan must be prepared by a qualified biologist and approved by CDFW prior to any ground-disturbing activities.

BIO-4: The construction or site manager shall ensure that no construction occurs within 250 feet of the artificial burrows or other active or occupied burrows unless active or occupied burrows are sheltered with hay bales and monitored by a qualified biologist; if this is done, work may occur within 20 feet of active or occupied burrows. If qualified biologists observe burrowing owls' agitation, work in the vicinity will stop. Additional shelter materials can be added until burrowing owls remain calm during construction activities.

BIO-5: If passive relocation is required, it shall be done by a qualified biologist from September 1 to January 31 and will follow the CDFW Staff Report on Burrowing Owl Mitigation Guidelines (CDFW 2012).

Geology and Soils

GEO-1: All grading operations and construction shall be conducted in conformance with the recommendations included in the Preliminary Geotechnical Report on the Project site that has been prepared by LandMark Geo-Engineers and Geologists (LandMark) in August 2020. Design, grading, and construction shall be performed in accordance with the recommendations of the project geotechnical consultant as summarized in a final written report, subject to review by the County, prior to commencement of grading activities.

A full description of recommendations in the Preliminary Geotechnical Investigation is provided in Section 4: Design Criteria of Appendix E. Recommendations are summarized below:

- **Site Preparation:** The site shall be properly cleared and grubbed. Any excavations resulting from site clearing shall be sloped to a bowl shape to the lowest depth of disturbance and backfilled under the observation of the geotechnical engineer's representative. Prior to placing any fills, the surface 12 inches of soil should be uniformly moisture conditioned by disking and wetting to a minimum of optimum plus 2 to 8 percent and compacted to a minimum of 90 percent of ASTM D1557 maximum density. Onsite native clays placed as engineered fill should be uniformly moisture conditioned by disking and wetting or drying to optimum plus 2 to 8 percent and compacted in 6-inch maximum lifts to a minimum of 90-percent relative compaction. Clods shall be reduced by disking to a maximum dimension of 1.0 inch prior to being placed as fill. The existing surface soil within the Project shall be removed to the appropriate recommended depths. An engineered building support pad shall be placed below mat foundations. Aggregate shall be compacted to a minimum of 95 percent of ASTM D1557 maximum density at 2 percent below to

4 percent above optimum moisture. Imported fill soil shall be nonexpansive and should meet the Unified Soil Classification System (USCS) classifications of ML (nonplastic), SM, SP-SM, or SW-SM with a maximum rock size of 3 inches and no less than 5 percent passing the No. 200 sieve. The geotechnical engineer should approve imported fill soil sources before hauling material to the site. Imported fill should be placed in lifts no greater than 8 inches in loose thickness and compacted to a minimum of 95 percent of ASTM D1557 maximum dry density at optimum moisture ±2 percent. An engineered support pad consisting of 12 inches of Class 2 aggregate base shall be placed below mat foundations. The aggregate base shall be compacted to a minimum of 95 percent of ASTM D1557 maximum density at 2 percent below to 4 percent above optimum moisture. Structures that are not sensitive to settlements, not heavy loaded, or that can be economically replaced or repaired such as small tanks, pumps, and vessels, can be supported on shallow foundations on reinforced structural fill. The performance of structural fill with respect to resisting liquefaction failure mechanisms, and reducing some of the static differential settlements can be enhanced by reinforced the structural fill with geogrid fabrics. The native soils should be excavated from the designated foundation areas extending 5.0 feet beyond all exterior foundation lines to 3.0 feet below the planned bottom of foundation level. Exposed subgrade should be inspected by the geotechnical engineer and if found to be loose, shall be scarified to a depth of 8 inches, uniformly moisture conditioned to 2 to 8 percent above optimum and recompacted to a minimum of 90 percent of the maximum density determined in accordance with ASTM D1557 methods. A 6-ounce non-woven separation fabric equivalent to Mirafi 160N or equivalent should be placed over the subgrade prior to placing the reinforced structural fill. In areas other than the basin backfill which are to receive housekeeping slabs or area concrete slabs, the ground surface should be presaturated (20 percent minimum moisture content) to a minimum depth of 24 inches and then scarified to 8 inches, moisture conditioned to a minimum of 5 percent over optimum, and recompacted to a minimum of 90 percent of ASTM D1557 maximum density just prior to concrete placement. All site preparation and fill placement should be continuously observed and tested by a representative of a qualified geotechnical engineering firm. Full-time observation services during the excavation and scarification process is necessary to detect undesirable materials or conditions and soft areas that may be encountered in the construction area. Auxiliary structures such as free-standing or retaining walls should have footings extended to a minimum of 30 inches below grade. The existing soil beneath the structure foundation should be prepared in the manner described for the building pad except the preparation need only to extend 24 inches below and beyond the footing.

- **Shallow Foundations, Structural Mats and Settlements:** The Project shall implement shallow spread footings and continuous wall footings to support the structures planned for offices, control rooms, and warehouses. Footings shall be founded on 3 feet of engineered granular fill as described in Appendix E. The foundations shall be designed using an allowable soil-bearing pressure of 2,000 pounds per square foot (psf). The allowable soil pressure shall be increased by one-third for short term loads induced by winds or seismic events. Resistance to horizontal loads shall be developed by passive earth pressure on the sides of footings and frictional resistance developed along the bases of footings and concrete slabs. Passive resistance to lateral earth pressure shall be calculated using an equivalent fluid pressure of 300 equivalent fluid pressure (pcf) (for imported sands) to resist lateral loadings. The top 1 foot of embedment shall not be considered in computing passive resistance unless the adjacent area is confined by a slab or pavement. An allowable friction coefficient of 0.35 (for imported sands) shall also be used at the base of the footings to resist lateral loading. Foundation movement under the estimated static (non-seismic) loadings and static site conditions shall not exceed 0.75 inch with differential

movement of about two-thirds of total movement for the loading assumptions stated above when the subgrade preparation guidelines given above are followed. Seismically induced liquefaction settlement shall be on the order of less than 0.75 inch. Mat foundations for lightly loaded structures like pumps, small tanks, generators, etc., shall be designed using an allowable soil bearing pressure of 1,500 psf when the foundation is supported on 12 inches of compacted Class 2 aggregate base (95 percent of ASTM D1557 maximum density to ±2 percent of optimum moisture). The native soils supporting the concrete structural mat and compacted aggregate base shall be moisture conditioned and recompacted as specified in Appendix E. The allowable soil pressure shall be increased by one-third for short-term loads induced by winds or seismic events. Design criteria for these mat foundations are provided in Appendix E.

- **Flexible Tank Foundations and Settlements**: The existing soils underlying the proposed tank area shall be removed to a depth of 36 inches below ground surface or a minimum of 24 inches below the bottom of the ring wall foundation (whichever is lower), extending to a minimum of 5 feet beyond the perimeter of the tank. Exposed subgrade shall be scarified to a depth of 8 inches, uniformly moisture conditioned to 2 to 8 percent above optimum moisture content, and recompacted to a minimum of 90 percent of the maximum density determined in accordance with ASTM D1557 methods. If soft conditions are encountered at the bottom of the excavation and subgrade compaction is not achievable, the native soil at the sub-excavation and footing excavation level shall be overlain by a woven geotextile stabilizing fabric (Mirafi HP 370 or equivalent). The area shall then be brought to finish grade with engineered fill consisting of the following components:

    - 36 inches of reinforced crushed aggregate base
    - 8 inches of crushed rock (1" x No. 4)
    - 4 inches of oiled sand

  The fill shall be crowned about 40 percent of the total center settlement to allow for differential settlement between the tank perimeter and center. If compaction of sub-excavation level is achievable, the 36 inches of aggregate base shall be placed in 8-inch maximum loose lifts and compacted to a minimum 95 percent of ASTM D1557 maximum density within 2 percent of optimum moisture. If bottom of excavation subgrade compaction is not achievable and the geotextile stabilizing fabric is utilized, the first 12-inch layer of aggregate base placed over the geotextile fabric shall be compacted to a minimum of 90 percent. The remaining engineered aggregate base fill shall be placed in 8-inch maximum loose lifts and compacted to a minimum 95 percent of ASTM D1557 maximum density within 2 percent of optimum moisture. The crushed rock tank underlayment shall meet the gradation requirements of ASTM C33, Size 57 (1" x No. 4 rock). The tank shall have a perimeter ring wall foundation which supports the tank wall and roof. The interior footings and the ring wall may be proportioned for a net load (in addition to the uniform tank liquid load) for dead load of roof weight (plus sustained live load). The minimum depth of the ring wall footing shall be 24 inches below the finished ground surface. The minimum footing width shall be 12 inches. Flexible connections such "Flex-Tend" expansion joints shall be used to connect exterior piping with the tank. The tank shall be preloaded and monitored for settlement prior to making piping connections. It may be necessary to readjust piping connections after the loading sequence. The estimated settlement for the different proposed diameter tanks with an imposed pressure load of 1,500 and 2,000 psf are included in Appendix E. If estimated settlements are excessive even for the flexible steel tanks and connections supported by the engineered fill, the existing soils underlying the clarifier tank shall be improved by soil mixing or

soil replacement (sand/cement) with 48-inch diameter shafts. The minimum surface area replacement ratio shall be 20 percent. Following soil mixing, the area shall be brought to finish grade with engineered fill consisting of the following components:

- 36 inches of reinforced crushed aggregate base
- 8 inches of crushed rock (1" x No. 4)
- 4 inches of oiled sand
- The fill may be crowned about 40 percent of the total center settlement to allow for differential settlement between the tank perimeter and center. Tank settlements with soil mixing improvement below the tank are shown in Appendix E.

- **Soil Mixing (Rigid Mats):** The use of soil improvement like soil mixing with cement or soil replacement (sand/cement) shall be used to reduce settlement to tolerable limits. The highly plastic native clays were found not to mix well with conventional soil mixing augers (Hudson Ranch 1 Plant site), and imported sands may be required for soil-cement mixing. Structural mat foundations placed over the improved soil shall be used to support the various structural elements of the plant. Mats overlaying soil mixed columns shall be underlain by 3 feet of crushed aggregate base (Caltrans Class 2, 1-½-inch or ¾-inch grading). The existing soils shall be improved by soil mixing or soil replacement (sand/cement) with 48-inch diameter shafts. The minimum surface area replacement ratio shall be 20 percent. Soil-cement design shall be provided by a licensed specialty contractor.

- **Auger Cast Piles:** Auger cast piles (cast-in-place grout with steel cage reinforcement) has been used successfully to provide deep foundations for heavily loaded and critical elements of industrial plants. Estimated capacities of 24- and 30-inch-diameter auger cast pile are provided in Appendix E. The structural capacity of the piles shall be verified by the structural engineer. The geotechnical engineer shall observe the auger cast pile drilling and electronic logs to evaluate each pile on a case-by-case basis.

- **Driven Piles:** The use of driven steel pipes had been used successfully for elevated pipe rack supports. Special provisions for corrosion protection due to the corrosive nature of the subsurface soils shall be implemented. Steel-driven pipe for the elevated pipe rack supports have been preliminarily sized as 10-inch-diameter with a 0.5-inch-thick wall. Axial and lateral loads were applied at 2 feet above ground surface. Estimated axial and lateral capacities of a 10-inch-diameter driven steel pipe are provided in Appendix E. Complete documentation of the proposed pile driving hammer shall be submitted to the geotechnical engineer for approval prior to mobilization. Driving records shall be maintained on each pile. The numbers of blows required to drive a pile each foot shall be recorded. Driving energy necessary to insure development of full design capacity shall be established after each selection of the pile driver. The geotechnical engineer shall observe pile driving and evaluate each pile on a case-by-case basis. Pre-drilling of pilot holes for piles to a depth of half the pile depth shall be allowed without reduction in pile capacity.

- **Concrete Mixes and Corrosivity:** A minimum of 6.5 sacks per cubic yard of concrete (4,500 pounds per square inch [psi]) of Type V Portland Cement with a maximum water/cement ratio of 0.45 (by weight) shall be used for concrete placed in contact with native soil on this Project (sitework including sidewalks, housekeeping slabs, and foundations). Admixtures may be required to allow placement of this low water/cement ratio concrete. Thorough concrete consolidation and hard trowel finishes shall be used due to the aggressive soil exposure. No metallic water pipes or

conduits shall be placed below foundations. Foundation designs shall provide a minimum concrete cover of 5 inches around steel reinforcing or embedded components (anchor bolts, etc.) exposed to native soil. If the 5-inch concrete edge distance cannot be achieved, all embedded steel components (anchor bolts, etc.) shall be epoxy coated for corrosion protection (in accordance with ASTM D3963/A934) or a corrosion inhibitor, and a permanent waterproofing membrane shall be placed along the exterior face of the exterior footings. Additionally, the concrete shall be thoroughly vibrated at footings during placement to decrease the permeability of the concrete. A qualified corrosion engineer shall evaluate the corrosion potential on metal construction materials and concrete at the site to obtain final design recommendations.

- **Embankment Construction and General Site Fill:** All areas to receive new fill for the embankments shall be stripped of all vegetation. The surface 12 inches of native soil shall be uniformly moisture conditioned to 2 to 8 percent above optimum moisture by disking and compacted in 6-inch maximum lifts to a minimum of 90 percent of ASTM D1557 maximum density. The embankment slopes shall be constructed no steeper than 3:1 (unless lined with concrete or high-density polyethylene/polyvinyl chloride [HDPE/PVC] sheeting) with a minimum crown width of 15 feet. Embankments shall be overbuilt by 6 inches and subsequently cut to the plan line and grade to remove loose material along the slope faces. Native cohesive soil from the site or adjacent land areas shall be used as general and embankment fill and as pond liner material. The fill soils shall consist of cohesive silty clay (CL) or clay (CH). The general and embankment fill shall be pulverized/disked to less than 1 inch maximum clod size, uniformly moisture conditioned to 2 to 8 percent over optimum, placed in 6-inch maximum lifts, and compacted to a minimum of 90 percent of ASTM D1557 maximum density.

- **Excavations:** All site excavations shall conform to California Division of Occupational Safety and Health (Cal/OSHA) requirements for Type B soil. The contractor is solely responsible for the safety of workers entering trenches. Temporary excavations with depths of 4 feet or less shall be cut nearly vertical for short duration. Excavations deeper than 4 feet shall require shoring or slope inclinations in conformance to Cal/OSHA regulations for Type B soil. Surcharge loads of stockpiled soil or construction materials shall be set back from the top of the slope a minimum distance equal to the height of the slope. All permanent slopes shall not be steeper than 3:1 to reduce wind and rain erosion. Slopes protected with ground cover may be as steep as 2:1; however, maintenance with motorized equipment shall not be implemented at this inclination.

- **Utility Trench Backfill:** Prior to placement of utility bedding, the exposed subgrade at the bottom of trench excavations shall be examined for soft, loose, or unstable soil. Loose materials at trench bottoms resulting from excavation disturbance shall be removed to firm material. If extensive soft or unstable areas are encountered, these areas shall be over-excavated to a depth of at least 2 feet or to a firm base and replaced with additional bedding material. Pipe zone backfill (i.e., material beneath and in the immediate vicinity of the pipe) shall consist of a 4- to 8-inch bed of ⅜-inch crushed rock, sand/cement slurry, and/or crusher fines (sand) extending to a minimum of 12 inches above the top of the pipe. If crushed rock is used for pipe zone backfill for utilities, the crushed rock material shall be completed surrounded by a 6-ounce non-woven filter fabric such as Mirafi 160N or equivalent. The filter fabric shall cover the trench bottom, sidewalls, and over the top of the crushed rock to inhibit the migration of fine material into void spaces in the crushed rock, which may create the potential for sinkholes or depressions to develop at the ground surface. Pipe bedding shall be in accordance with the pipe manufacturer's recommendations and local codes and/or bedding requirements for specific types of pipes. Native backfill shall be placed

and compacted only after buried pipes are encapsulated with suitable bedding and pipe envelope material. Mechanical compaction is recommended; ponding or jetting shall not be allowed, especially in areas supporting structural loads or beneath concrete slabs supported on grade, pavements, or other improvements. All trench backfill shall be placed and compacted in accordance with recommendations provided above for engineered fill. The pipe zone material (crusher fines, sand) shall be compacted to a minimum of 95 percent of ASTM D1557 maximum density. Pipe deflection shall be checked not to exceed 2 percent of pipe diameter. Soils used for trench backfill shall be placed in maximum 6-inch lifts (loose) and compacted to a minimum of 90 percent of ASTM D1557 maximum density at a minimum of 4 percent above optimum moisture. Granular trench backfill used in building pad areas shall be plugged with a solid (no clods or voids) 2-foot width of native clay soils at each end of the building foundation to prevent landscape water migration into the trench below the building. Backfill soil of utility trenches within paved areas shall be uniformly moisture conditioned to a minimum of 4 percent above optimum moisture, placed in layers not more than 6 inches in thickness, and mechanically compacted to a minimum of 90 percent of the ASTM D1557 maximum dry density, except that the top 12 inches shall be compacted to 95 percent (if granular trench backfill).

- **Seismic Design:** Designs shall comply with the latest edition of the CBC for Site Class D using the seismic coefficients given in Appendix E.

- **Laydown Yard:** The new laydown yard shall consist of a minimum of 8.0 inches of Caltrans Class 2 aggregate base placed over 12 inches of moisture-conditioned native clay soil (minimum of 2 percent above optimum moisture) compacted to a minimum of 90 percent of the maximum dry density determined by ASTM D1557. Alternately, the access roads shall consist of 6 inches of aggregate base placed over 9 inches of lime-treated soil compacted to a minimum of 90 percent. Preliminary estimates of lime content required to stabilize the clay soils is 6 percent hydrated lime by weight of soil.

- **Pavements:** Pavements shall be designed according to the 2020 Caltrans Highway Design Manual or other acceptable methods. The public agency or design engineer shall decide the appropriate traffic index for the site.

- The Project structural engineer shall confirm whether an ASCE 7-16 Section 11.4.8 exception applies to the Project. If none of the exceptions apply, a qualified geo-engineer shall be consulted to perform a site-specific ground motion hazard analysis.

- Development of building foundations and concrete flatwork shall include provisions for mitigating potential swelling forces and reduction in soil strength, which can occur from saturation of the soil. Typical measures considered to remediate expansive soil include:

    - Capping silt/clay soil with a non-expansive sand layer of sufficient thickness (3 feet minimum) to reduce the effects of soil shrink/swell
    - Moisture conditioning subgrade soils to a minimum of 5 percent above optimum moisture (ASTM D1557) within the drying zone of surface soils
    - Designing foundations to be resistant to shrink/swell forces of silt/clay soil
    - A combination of the methods described above

PALEO-1: Developer shall retain the services of a qualified paleontologist and require that all initial ground-disturbing work be monitored by someone trained in fossil identification in monitoring contexts. The consultant shall provide a supervising paleontological specialist and a paleontological monitor to be present at the Project construction phase kickoff meeting.

PALEO-2: On the first day of construction and thus prior to any ground disturbance in the Project site, the supervising cultural resources specialist and cultural resources monitor shall conduct initial Worker Environmental Awareness Program (WEAP) training to all construction personnel, including supervisors, present at the outset of the Project construction work phase, for which the lead contractor and all subcontractors shall make their personnel available. This WEAP training will educate construction personnel on how to work with the monitor(s) to identify and minimize impacts to paleontological resources and maintain environmental compliance and will be performed periodically for new personnel coming onto the project as needed.

PALEO-3: The contractor shall provide the supervising paleontological resources specialist with a schedule of initial potential ground-disturbing activities. A minimum of 48 hours shall be provided to the consultant of commencement of any initial ground-disturbing activities such as vegetation grubbing or clearing, grading, trenching, or mass excavation.

A paleontological monitor shall be present on site at the commencement of ground-disturbing activities related to the Project. The monitor, in consultation with the supervising paleontologist, shall observe initial ground-disturbing activities and, as they proceed, make adjustments to the number of monitors as needed to provide adequate observation and oversight. All monitors shall have stop-work authority to allow for recordation and evaluation of finds during construction. The monitor shall maintain a daily record of observations as an ongoing reference resource and to provide a resource for final reporting upon completion of the Project.

The supervising paleontologist, paleontological monitor, and the lead contractor and subcontractors shall maintain a line of communication regarding schedule and activity such that the monitor is aware of all ground-disturbing activities in advance in order to provide appropriate oversight.

PALEO-4: If paleontological resources are discovered, construction shall be halted within 50 feet of any paleontological finds and shall not resume until a qualified paleontologist can determine the significance of the find and/or the find has been fully investigated, documented, and cleared.

PALEO-5: At the completion of all ground-disturbing activities, the consultant shall prepare a Paleontological Resources Monitoring Report summarizing all monitoring efforts and observations, as performed, and any and all prehistoric or historic archaeological finds, as well as providing follow-up reports of any finds to the SCIC, as required.

Transportation

TRA-1: A Commute Trip Reduction (CTR) program shall be implemented to discourage single-occupancy vehicle trips and encourage alternative modes of transportation such as

carpooling, taking transit, walking, and biking. The CTR program could include features such as carpooling encouragement, ride-matching assistance, preferential carpool parking, half-time transportation coordinator, vanpool assistance, and bicycle end-trip facilities (parking, showers, and lockers) and provide employees with assistance in using alternative modes of travel.

TRA-2: The Highway 111/McDonald Road intersection shall be improved to Caltrans' satisfaction prior to the Project's certificate of occupation, including the installation of a northbound left-turn pocket prior to the Project's opening, utilizing one of the four intersection control methods (existing two-way stop, all-way stop, signal, roundabout) which was analyzed in an Intersection Control Evaluation (ICE) analysis.

Utilities and Service Systems

UTIL-1: If the IID does not receive its annual 3.1 maf water apportionment according to the QSA obligations of Colorado River water during the Project's 30-year lifespan, the Applicant shall work with IID to ensure any reduction in water availability can be managed by the Project.