UTILITY PLAN

GRADY RANCH PRECISE DEVELOPMENT PLAN

MARIN COUNTY, CALIFORNIA

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A. WATER SYSTEM

1. Estimated Domestic Water Demand

This project proposes to obtain domestic, fire and irrigation water from the Marin Municipal Water District (MMWD). The domestic demand for this project was estimated based on methodology typically used by MMWD; that is, MMWD estimates water demand based on the size and type of use of the facility and consumption rates for similar types of uses. In the absence of data related to prior use or other similar facilities, MMWD refers to "Calculated Average Consumption Comparison Chart (updated 3/21/91)" (hereinafter, the Chart) to determine the projected consumption of a new facility. The Chart estimates a demand based on a rate of use per square foot of a type of use, (e.g. office, health club, medical office) or by another measure of the size of a facility, (e.g. the number of motel rooms, number of seats in a restaurant).

There are two facilities similar to Grady Ranch in use in the vicinity. These are the Skywalker Ranch and Big Rock Ranch. An analysis of the water consumption at the Skywalker and Big Rock Ranches revealed that the Chart overestimates water use at these facilities, primarily due to the lower intensity of use per square foot of production space compared to a typical office building.

The following table breaks down the square footage of the proposed Grady Ranch building, based on the type of use. Based on actual demand from Big Rock and Skywalker as noted above, half of the Chart demand rate has been applied to the space designated as Office. Other designated uses incorporate the demand rates directly from the Chart. Guest suites have been assigned a motel rate per room; the restaurant has been assigned the standard restaurant rate per seat; the fitness area has been assigned a rate of a health club; the wine cave, stages, and storage have been assigned a "warehouse" rate per square foot; and the set shop has been assigned an industrial assembly rate per square foot. No rate has been applied to space for underground parking.

The irrigation demand below estimates irrigation needs for ornamental plantings and native restoration plantings. The estimate below was developed based on the University of California and California Department of Water Resources Landscape Coefficient and Water Use Classification of Landscape Species (WUCOLS) methodology. The estimated irrigation demand for the first year of Native Plantings is 1.63 AF/yr. It is anticipated that the demand will decrease each year as the plant roots are established, and that by year five, the native plants will not require supplemental irrigation. The estimated

irrigation demand for Ornamental Plantings is 2.38 AF/yr. The total irrigation demand for the first year of the project is 4.01 AF/yr, and after five years, it is anticipated that the total irrigation demand will have declined to 2.38 AF/yr.

The Master Plan included approvals for construction of an additional 160,200 SF of buildings on the site. As the functions of these other buildings (fitness center, guest accommodations) have been consolidated into the main building, future development will be limited to archival storage. This has been noted as "Future Phase" in the table below and assigned a warehouse rate per square foot.

Estimate per Modified Chart				
Type of Use	**Quantity**	**Unit**	**Average consumption (AF/yr per 1,000SF)**	**Estimated Demand (AF/yr)**
Office (includes. stages, restrooms, lobby)	89,613	SF	0.05	4.48
Guest Suites	20	Suite	0.13 / room	2.60
Restaurant seats	120	Seat	0.029 / seat	3.48
Fitness	4,330	SF	0.4	1.73
Stages	51,237	SF	0.021	1.08
Set Shop	2,400	SF	0.085	0.20
Storage/Mechanical	18,462	SF	0.021	0.39
Wine Cave	3,960	SF	0.021	0.08
Gate House	900	SF	0.05	0.05
Landscape Irrigation				4.01
Subtotal				*18.10*
Future Phase (Archive)	160,200	SF	0.021	3.36
Total				**21.46**

Based upon the above analysis, the annual domestic and irrigation water demand for the current phase of Grady Ranch is 18.1 AF with 3.36 AF of future potential use for a total of 21.46 AF.

2. Water Supply

As provided for in the approved Master Plan, water service for Grady Ranch is to be supplied by the Marin Municipal Water District (MMWD). At the time the County commissioned the preparation of the 1996 EIR for the Lucasfilm Ltd. Grady Ranch/Big Rock Master Plan, MMWD indicated that there was an

adequate water supply to serve the Grady Ranch portion of the Master Plan. The District also indicated that because the Ranch was outside of MMWD's service area, annexation would be required. Since 1996, the profile of MMWD's available water supply has changed. The project is outside of the service area and therefore not included in MMWD's demand projections.

The project proposes to "offset" its projected water demand by reducing demand from other MMWD customers. Lucasfilm will contribute to the funding of a recycled water line currently under design by MMWD in an amount commensurate with the estimated demand and 1.5 offset ratio.

3. Fire Protection Water

Per the 2007 California Fire Code, the project must be able supply 1,500 gallons per minute (GPM) for a duration of four hours for fire protection (360,000 gallons). There are two options for meeting this requirement. The first is to use a fire pump equipped with a backup power supply to provide the needed pressure and flow from the municipal system. In order for this to be a viable option, MMWD would need to verify there is sufficient capacity within their system to meet the demand. The second option is to construct a storage tank of sufficient size and at a sufficient elevation. Unless and until MMWD indicates that their system can meet the fire flows, the project will proceed with the second option, as follows.

A 400,000 gallon tank will be constructed on the hillside above the building to contain this required fire flow volume. The tank will be filled from a new 8" water line fed from the MMWD potable system, with additional pressure provided by a private booster pump. The pump will be located on Grady Ranch property on the south side of Lucas Valley Road. Power will be supplied by the Grady Ranch PG&E electric service, and backup power will be supplied from a diesel powered onsite emergency generator. To provide sufficient pressure to reach the tank inlet elevation, an in-line centrifugal pump, capable of pumping 750 GPM under full load, will be used. This will allow the tank to be refilled within an eight hour period. A back flow preventer sized appropriately for the project flow will be installed between the meter and pump station to provide separation from the private water system and public water system. The MMWD system would end at the meter. Skywalker Properties would own and operate the backflow preventor, pump, emergency generator, piping and tank.

The tank outlet will be an 8" line within a trench which will follow the alignment of the Upper Fire Road from the tank area down to the service road.

At this point the line will branch, with one 6" line serving the FDC and PIV, and then connecting to the building fire sprinkler riser, another 6" line leading to a fire hydrant at the southern end of the Main Building, and a third line leading to a fire hydrant at the northern end of the Main Building. The tank will pressurize the fire lines so that the fire hydrant at the southern end of the Main Building will have a static water pressure of approximately 53 P.S.I. and the fire hydrant at the northern end of the Main Building will have a static pressure of approximately 37 P.S.I.

The approximate dimensions of the tank will be 58' in diameter and 22' high. It will be painted an acceptable color to match the surrounding environment, and trees will be planted near it to further obscure the view of the tank. The tank will be welded steel construction, with a concrete ring foundation. The proposed water tank and retaining walls will be located on a graded pad founded on stable Franciscan Complex sandstone bedrock (see sheets C1.1 and C2.4 for cross sections). The tank will be designed and constructed with two feet of freeboard between the maximum water surface and the top of the tank wall. The outlet pipe will be located approximately one foot above the bottom of the tank, to minimize the introduction of bottom sediment into the fire suppression system. This will result in one foot of "dead space" at the bottom tank. Given the dimensions above, the available volume within the tank for fire flows is 375,302 gallons.

The geotechnical investigation included a boring within the area of the proposed water tank pad (boring RW-1). The proposed water tank pad area is underlain primarily by Franciscan Complex sandstone bedrock with a thin (about 2 to 4 feet thick) colluvial cover. The upper 5 feet of sandstone bedrock is generally severely weathered and friable, with hardness increasing with depth. The proposed water tank and retaining walls will be founded on stable Franciscan Complex sandstone bedrock.

As noted above, the fire suppression water will be supplied by the MMWD potable system. As the water in the tank will not have a significant "turn over" period, it is anticipated that some supplemental disinfection will be necessary to maintain water quality within the tank. As the water in this tank will not be used for potable uses, a chlorine residual will not necessarily be maintained at all times.

The tank will be equipped with an overflow line and an emergency drain line which will be capable of draining the tank to the outdoor stage, a sunken area adjacent to the yard. This would only be used in the event that a structural failure required the tank to be immediately drained and would allow the water in the tank to be stored until repairs could be affected. The outdoor stage

would be capable of containing 80% of the capacity of the water tank. No infrastructure is provided for returning the water from the outdoor stage to the tank; temporary pumps and lines would be used. This temporary emergency storage location would prevent an emergency release of water to the nearby creeks, which would be prohibited by environmental regulatory agencies.

Per the Conditions of Approval, the water lines leading to and away from the tank will be designed to accommodate anticipated ground movement due to earthquakes without breaking, or in the event of breaking, to automatically shut off to prevent loss of water, and to be rapidly repaired to restore service. The tank design will follow the design criteria which will be developed by MMWD. Further details of the tank design will be developed during the design stage of this project.

4. Water Utility Construction

i. Extension of MMWD Water Line

The closest MMWD water line to the project is a 12" diameter water main which terminates in Lucas Valley Road adjacent to Westgate Drive. The project proposes to extend this 12" waterline from the current end of the line, along the proposed alignment for Lucas Valley Road, terminating at the Grady Ranch entrance. This extension of the MMWD main would be designed and constructed under the direction of MMWD, and will be funded by Skywalker Properties.

The waterline will be within the public right-of-way and a public utilities easement will not be required. The line will be constructed of 12" PVC (C900) water line and will be installed with a minimum of 36" of cover. The line will cross an existing creek via a new vehicular bridge along Lucas Valley Road (Bridge 1, see sheet C3). The line will penetrate the planned abutments and traverse the bridge within the hollow box girder section. The water line pipe material will transition to welded steel pipe with an appropriate corrosion resistant coating and joint restraint at the transitions.

ii. Potable Water Facilities Construction

Domestic, fire and irrigation service for the project will be obtained from the MMWD main, which will be extended to the Grady Ranch entrance as described above. The fire water will be an 8" service, which will run through a meter, backflow preventer and pump. The

backflow preventor and pump will be located within a subgrade vault located south of Lucas Valley Road, outside of the right-of-way.

A single line for domestic and irrigation water will be tapped from the MMWD main and will be metered south of Lucas Valley Road, with the meter size to be determined by MMWD. Skywalker Properties will own and operate all water facilities downstream of the meter. After the meter, the line will enter the subgrade vault containing a backflow preventor and booster pump. The line will then split into separate lines for irrigation and domestic use. The irrigation line will be submetered at this location. Although it is conventional to have separate points of connection and separate irrigation and domestic meters, it is inefficient to do so for this project, as that would necessitate a second booster pump. The submeter provides the needed information in a more efficient manner.

The subgrade vault will be set at a grade so as to appear unobtrusive. The vault will be sized to contain the required backflow and pumps needed for the fire, domestic and irrigation water. Though the final dimensions will not be selected until after the facilities have been sized, it is estimated it will be approximately ten feet wide by 20 feet long. Access to the vault would be restricted to Skywalker Properties maintenance personnel. Vault layout and access will be configured so that it is not considered a permit-required confined space, per OSHA.

The three water lines (8" fire, 3" irrigation and 4" domestic) will cross Lucas Valley Road attached to the walls of a 6' diameter reinforced concrete pipe tunnel. This tunnel will be constructed prior to the construction of the realigned Lucas Valley Road in this area, and will allow for easy maintenance access to the utilities once the road is relocated. The tunnel will terminate to the east of the Main Entrance Road on the Grady Ranch property, and pipes will be constructed in a trench after this point. Water lines will be installed in a trench with separation between water pipes equal to at least the diameter of the larger of the pipe. At least 2.5 feet of cover will be provided, and trench backfill material will be free of rocks and properly compacted. Where pipes are to be installed in roads where the grade exceeds 10%, check dams will be installed every 100' to discourage excessive groundwater movement through the trench. Water lines will be separated at least 10' from sewer lines.

The water lines will be required to cross existing creeks via a vehicular bridge at two locations (Bridges 2 and 4, see Sheet C3). At these

locations, the water line pipe material will transition to welded steel pipe with an appropriate corrosion resistant coating and joint restraint at the transitions.

The irrigation line will run directly to the 40,000 gallon irrigation storage tank on the hillside, and will be connected to the tank with an AWWA-compliant air gap. Water in this tank will be supplemented by rain water collected from the roof of the Main Building, pumped to the tank in separate piping. The outlet piping from the irrigation tank will serve the irrigation system. The domestic line will be connected directly to the Main Building.

B. SANITARY SEWER SYSTEM

The Main Building sewage will be collected within a wet well, located east of the Main Building outside of the stream conservation area, and transported via 4" force main to the intersection of the Main Entrance Road / Lucas Valley Road. The sanitary sewer force main will follow the same alignment as the water lines, with the required horizontal and vertical separation.

The pump, wet well and sanitary sewer force main will be sized to be capable of handling all current anticipated sanitary sewer flows as well as all future anticipated flows from the Main Building and surrounding buildings. The sanitary sewer force main will be required to cross an existing creek via a vehicular bridge at two locations (Bridges 2 and 4, see sheet C3.1). At these locations, the sanitary sewer line material will transition to ductile iron pipe with an appropriate corrosion resistant coating and restrained connections.

A new gravity sanitary sewer line will connect the wet well at the Main Entrance to the site to existing Las Gallinas Valley Sanitary District (LGVSD) facilities located at the intersection of Lucas Valley Road and Westgate Drive. The sanitary sewer gravity main will be required to cross an existing creek via the new vehicular bridge (Bridge 1, see sheet C3.1). At this location, the sanitary sewer line material will transition to ductile iron pipe with an appropriate corrosion resistant coating and restrained connections.

The sanitary sewer force main will enter the gravity drained system at an approximate invert elevation of +238.0 feet and will enter the existing LGVSD system at an approximate invert elevation of +212.0 feet. This allows for an average slope of 1.2 feet / 100'. Estimated average sanitary sewer flow volumes from the building are 0.046 cfs and peak sanitary sewer flow volumes from the building are 0.17 cfs. The capacity of a 8" PVC / HDPE sanitary sewer at a slope of 1.2 ft / 100' is 0.70 cfs, (assuming 0.5D Capacity and n=0.013). The minimum slope required for the pipe to

maintain self-cleaning at minimum flows is 0.85 ft / 100'.

The majority of the sanitary sewer gravity line along the alignment of Lucas Valley Road will be installed via conventional open trench methods. Certain sections of the sanitary sewer line along Lucas Valley Road will require installation via horizontal directional drilling methods (HDD) in order to maintain gravity flow and prevent excessively deep open trench installations. The sewer alignment will maintain the required horizontal and vertical separation from the adjacent MMWD water line.

C. ELECTRICAL SYSTEM

Electricity for the project will be provided by PG&E from existing 12 KV service in Lucas Valley Road. The existing service in the vicinity of the project is on overhead power lines supported by joint poles (which also support telecommunications and data – see Section 4). As part of this project, the overhead electric, telephone and data lines will be undergrounded into a joint trench in Lucas Valley Road along the entire property frontage. The joint trench will begin at the pole providing service to the property adjoining the eastern property line so the existing service to the adjacent property will remain unchanged. The trench will continue west along Lucas Valley Road for approximately half a mile to the west of the western gate which is a secondary entrance to Grady Ranch. The trench will be located in the center of the road an adequate distance from the sewer and water lines, where sewer and water are also present.

The PG&E power lines that run north-south through the site, crossing the western road are not proposed to be undergrounded or relocated as part of this project. The terminus pole on Lucas Valley Road will remain and the lines will be connected to the underground at this location.

It is anticipated that a pull box will be required for the electric lines approximately every 300'. Where feasible, these pull boxes will be located in the vicinity of existing power poles, within the right-of-way, but outside of the traveled way. In some cases, to provide sufficient clearance and workspace, a retaining wall may need to be constructed. At this preliminary level, the locations of the pull boxes and retaining walls have not yet been identified. However, given the length of this project, it is anticipated that at least five pull boxes will be needed. Additional vaults will be needed to accommodate transformers and other services along the limits of the undergrounding.

To provide the estimated 6,000 amps electrical demand required for the project, an aboveground 12 KV switchgear, circuit breaker and interruptor switch will be located across Lucas Valley Road from the Main Entrance Road. From this location, 12KV service for the project will run in a joint trench across Lucas Valley Road, up the Main

Entrance Road, across a bridge, to two step down transformers located west of the service road near the yard. Landscaping to obscure the transformers will conform to PG&E setback requirements, though the transformers will be privately maintained. From these transformer, conduit carrying the 480 V cables will run under the Main Building to the electrical and mechanical room on the west side. The joint trench will remain outside of the SCA, except to cross it along proposed road alignments.

D. TELEPHONE AND DATA

Telephone service in the vicinity of the project is provided by AT&T via overhead copper lines located on Lucas Valley Road. AT&T also provides fiber optic data service via overhead lines. As discussed above, the overhead lines will be undergrounded as part of the project.

Splitter boxes will be provided across Lucas Valley Road from the Main Entrance Road. A telephone room within the Gate House will allow configuration and expansion of the system when it is expanded to buildings along the West Road. From the Gate House the telephone and data lines will join the joint trench to the Main Building.

E. <u>OTHER UTILITIES</u>

1. Outdoor Lighting

Lighting around the Main Building is covered in the architectural plans. Lighting along the entrance road will consist of short (under 4 feet in height) downcast fixtures at a spacing of approximately 100 feet, and at bridge locations.

2. Building Heating and Cooling

A geoexchange system and heat pump will be used for heating and cooling the building, which will be less resource intensive than use of a traditional electric or gas fired heater and evaporative cooling tower. The geoexchange system uses a system of coiled pipes buried in the earth and a heat pump to alter the indoor air temperature. Rather than burning fuel to heat the building, the geoexchange system circulates fluid through the coils which are heated by the relatively constant temperature of the earth. This heat is carried to the geoexchange system that uses electrically-driven compressors and heat exchangers in a vapor compression cycle to concentrate the earth's energy and release it inside the building at a higher temperature. Duct fans then distribute the heat to various rooms. In summer, the process is reversed in order to cool the building. Excess heat is drawn from the building, expelled to the loop, and

absorbed by the Earth.

Geoexchange coils will be buried under at least 6 feet of fill, southeast of the building, as shown on Sheet C4.1. The spacing and quantity of coils will be dependent on the thermal conductivity of the soil materia, and has been estimated for this submittal. Coils will be located outside of the Stream Conservation area, as shown on Sheet C4.1.