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DATE: March 20, 2017

TO: Michelle Nielsen, Planner
 Humboldt County Planning Division
 3015 H Street
 Eureka, CA 95501

SUBJECT: Preliminary Drainage Report
 Emerald Family, LLC – Humboldt County APN 522-201-001 Willow Creek, CA

The purpose of this memo is to summarize the preliminary storm water management plan for Emerald Family LLC site development located on 130 Flower-McNeil Rd in Willow Creek, CA. Please accept the following summary as preliminary and subject to change upon final approval of the proposed developments.

The parcel area is approximately 41.8 acres, 26.7 acres of which was examined for pre- and post-development runoff. The existing land cover of the proposed development area is predominantly packed bare soil with a maximum slope of 3%. There are two existing structures that will be retained in the project. The proposed development consists of 9.40 acres of impervious surface made up of approximately 5.2 acres of buildings, 3.25 acres of pavement and concrete, and 0.96 acre of lined rain catchment pond and pre-treatment pond. Low impact development features such as bioswales, detention basins and the ponds will be constructed to limit impacts of the proposed development to the hydrograph.

The construction of the project is proposed in three phases. First, the roads and parking lots will be paved, the outdoor cultivation area will be utilized and the bioswales and bioretention features will be installed. In Phase II, construction of the pretreatment pond and rainwater storage pond, Greenhouse “C” and Building “D” will be completed. Phase III will conclude the complete project buildout with construction of Building “E”.

The rational method was used to calculate the stormwater volume generated in a 24-hour 85th percentile precipitation event (as required in the National Pollution Discharge Elimination System permit for Industrial Projects). The 24-hour 85th percentile storm depth was assumed to be 1.36 inches based on calculations using 44 years of daily precipitation data from the nearby Hoopa Gauge (California Data Exchange Center station ID: HPA). Although the stormwater volume will increase with the proposed impervious surfaces, the net change in stormwater runoff from the site will decrease due to the proposed capacity of the rain catchment pond and the proposed bioswale and detention features. The volume of stormwater, proposed LID feature storage, and stormwater runoff from the site during each of the phases of buildout is reported in Table 1 below.

Table 1: Stormwater Runoff Volume Summary

	Impervious Surface (ft ²)	24 Hour Stormwater Volume (ft ³)	Detention Storage (ft ³)	Pond Stormwater Capacity (ft ³)	24-Hour Runoff Volume (ft ³)
Pre-Development	22,630	28,340	0	0	28,340
Phase I	129,352	36,217	16,589	0	19,629
Phase II	334,330	52,479	16,589	26,517*	13,253
Phase III (Post Development)	409,556	58,191	16,589	26,517*	15,085

**The Rainwater Catchment Pond volume is about nine acre feet but the capacity to detain stormwater if the pond is at full storage capacity will be 26,517 ft³.*

Low Impact Development (LID) features such as ponds, detention basins and bioswales are included in the site plan to maximize stormwater recycling, detention and infiltration. All runoff from the proposed structures will be diverted to the pre-treatment pond which will spill into the rainwater catchment pond to be stored for irrigation. The planned detention basin and bioswale features are dispersed between the proposed structures in the development area and are routed in sequence. Soil tests in the area indicate high infiltration rates which will make the bioswales and detention basins effective in minimizing surface runoff.

The attached site plan has been divided into sub drainage basins to illustrate the drainage sequence of project area. The drainage sequence begins on the northeast Corner of the development. The precipitation on the parking lot and existing structure in Area A will drain into a detention basin located within Area A. The precipitation on the proposed paved surfaces in Area B will drain to the detention basin located within Area B. The detention basins will allow infiltration and sedimentation. Overflow from the basins in Areas A and B will be piped to a larger detention basin which will also accumulate runoff from Area C. A bioswale is proposed to convey the accumulated flow from Areas A through C, into a detention basin in Area D. The swale will be cobbled and vegetated with low slope to insure a flow velocity of less than 2 feet per second to allow sedimentation and filtration. Overflow from the detention basin in Area D will flow into an existing vegetated swale which extends to the West through Area E, G and H into the existing vegetated basin. The swale will be expanded and improved to accept the accumulated flows from Area A through E. Runoff from the greenhouses in Areas C, D and E will be directed to a French drain and piped to the pre-treatment pond. Runoff from the paved areas in Area F will be drained to the detention basin in Area H (bordering the Southwest corner of Area F). A drop inlet will convey runoff from the paved area north of Building “A” to the detention basin. Building “A” and Building “D” will be guttered and the runoff will be collected in a tank and pumped to the pre-treatment pond in Area J. The remainder of runoff from Area H will be directed into the existing vegetated basin.

The paved parking lot in Area I will be drained via a drop inlet and discharged to the bioswale beginning at the northeast corner of Area G. The structure in area I will be guttered and piped directly to the pre-treatment basin. The outdoor cultivation located in Area I and Area G will be graded to drain towards the existing vegetated basin. The stormwater flowing across the cultivation will be interrupted by an infiltration ditch along the northern edge of the cultivation before overflowing to the existing vegetated basin. The cultivation in area J will be drained by a ditch along the western border of the pond area and discharged to the northwest corner of the existing vegetated basin.

The Pre-Treatment Pond in Area J will receive all roof-top runoff from the site. All structures will be guttered to holding tanks of no more than 5,000-gallon capacity from which water will be pumped to the pre-treatment pond. Treated water will spill to the Rainwater Storage Pond which will store treated roof runoff and direct rainfall for irrigation use. An overflow pipe will be constructed in the rainwater storage pond so that the maximum storage volume of the pond is less than the total capacity. The extra capacity of the pond will serve as a reserve to detain the roof runoff in the design storm event (26,517 ft³ for the complete project buildout). The final discharge from the proposed development area for any stormwater that does not infiltrate, evaporate or get consumed, will be through an outfall from the existing vegetated basin. The existing pipe outfall will be improved with a new pipe sized to convey the stormwater runoff and rock armoring of the outlet to limit scour between the outlet and Trinity River.

Area K is a steep bank which will be drained off the property to the west of the rainwater catchment pond through an existing cutoff ditch, which will be improved and maintained with no stormwater detention features.

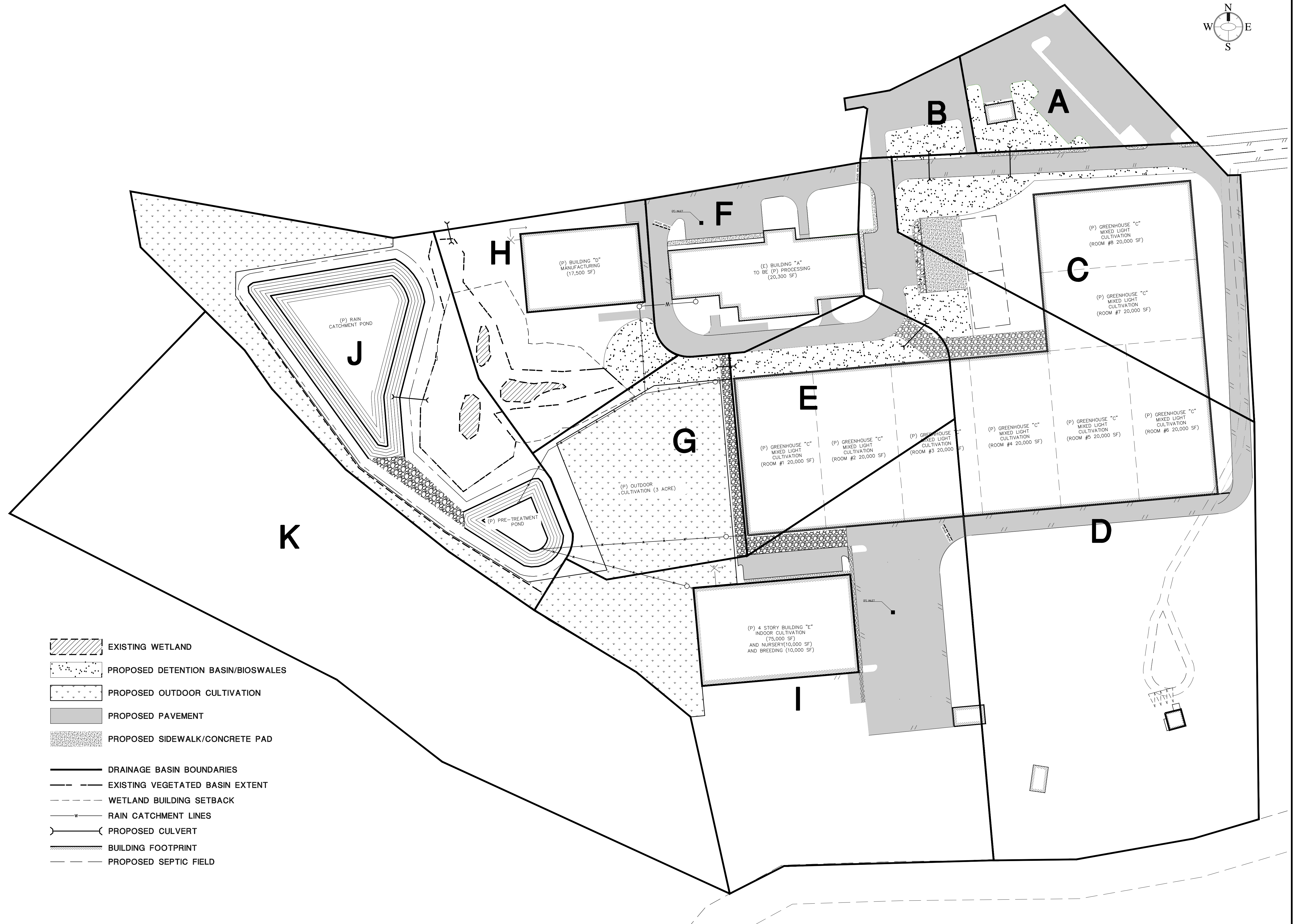
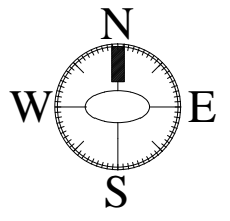
During the 85th percentile, 24-hour storm event sufficient stormwater detention will occur post construction. Detention volumes are expected to infiltrate at high rates and the use of LID features will minimize peak storm water runoff, improve the quality of runoff, and provide aesthetic improvement to the final development. This summary is preliminary until final approval of the proposed development, at which point a full drainage report will be furnished. The final stormwater drainage study will include further specifications of all LID features.

Please contact me at (707) 444-3800 or pwhite@manhard.com if you have any questions or concerns.

Sincerely,

Praj O. White, P.E, #C65025

Area Manager



- EXISTING WETLAND
- PROPOSED DETENTION BASIN/BIOSWALES
- PROPOSED OUTDOOR CULTIVATION
- PROPOSED PAVEMENT
- PROPOSED SIDEWALK/CONCRETE PAD
- DRAINAGE BASIN BOUNDARIES
- EXISTING VEGETATED BASIN EXTENT
- WETLAND BUILDING SETBACK
- RAIN CATCHMENT LINES
- PROPOSED CULVERT
- BUILDING FOOTPRINT
- PROPOSED SEPTIC FIELD

DATE	REVISIONS

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EMERALD FAMILY, LLC
131 FLOWER-McNEIL RD. / APN: 522-201-01
PROPOSED SITE PLAN

PROJ. MGR.: PIW
 PROJ. ASSOC.: PBS
 DRAWN BY: RBT
 DATE: 03-20-17
 SCALE: SEE PLAN

SHEET
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 HAY.WCCA
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March 21, 2017 - 08:37 - Dwg Name: P:\hwywcc01\cadd\StormWater\Work Area\170208.EFF - CJP - Site Plan - Drainage.dwg - Updated By: RBurton\cauzer