VANDERWALL ENGINEERING

Hydrology Report to Determine Area of Influence for Cultivation Irrigation Wells

for

Nina Star Farms

APN: 014-006-16

23180 Shady Grove Road
Middletown, CA 95461

September 6, 2021

Prepared for:

Lake County
Community Development Department
255 North Forbes Street
Lakeport, CA 95453

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INTRODUCTION

The purpose of this study is to determine the area of influence on an existing well that will continue to be used for residential domestic supply and irrigation for proposed commercial cannabis. The "Project" is currently proposing 37,446 sf of commercial cannabis canopy area.

The parcels on which the Project is located is owned by Nina Star LLC and will be managed by Nina Bogdonava.

This report estimates the amount of water available and recharge rate during a drought year from the existing wells. In addition, this report estimates the zone of influence to the surrounding and to estimate the cumulative impacts where interference is with existing wells.

STUDY LIMITATIONS

The yield of wells cannot be estimated with precision because of all the uncertainty with the aquifer and the amount of rain percentage of rainfall that percolates through the ground. Therefore, conservative estimates and assumptions are used in this report.

This study is based on the following information and assumptions.

- Cooper – Jacob well equation
- Well Completion Reports obtained from Lake Co EHD, and CA State database.
- Well Yield Test and Drillers Reports by Jim's Pumps
- Rainfall for a drought year is 20% of annual precipitation
- Aquifer is uniform throughout the area of well influence

WELL

There is only one (1) well that is proposed to be used for this project that is analyzed in this report. And two residential neighboring wells are analyzed as well. (See Surrounding Well Map in Appendix C). These wells are identified as follows:

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Wm. VanDerWall, R.C.E. 62560
3745 E. Main Street • Kelseyville, CA 95451 • (707) 279-4887
www.vdwengr.com • contact@vdwengr.com

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WELL #1

- APN: 014-006-16, Nina Star Primary well for 2BR dwelling and proposed cultivation (37,446 sf canopy).
- Total drill depth of +43 feet below the surface.
- The capacity of the well is at least 16 gpm. (See Appendix A)
- Pump depth: 43 feet
- Unconfined aquifer with thickness of 33feet (10m) (no driller's log available – assumed from characteristics of Well #3 below)

WELL #2

- APN: 115-004-05. Owned by Kevin and Barbra Valllauri
- The total drill depth of 125 feet, screen at 30-70 depth(Appendix A – 8/4//1999)
- The capacity is only 1.5 gpm.
- Use: 3 BR dwelling unit
- Unconfined aquifer with thickness of 40 feet (12.2m)

WELL #3

- APN: 014-006-14 Owned HiCann LLC
- Total drill depth of 26 feet (Appendix A – 8/3/81)
- Capacity of at 10 gphr per well driller's report
- Use: 3BR Dwelling
- Unconfined aquifer with thickness of 11 feet (3.35m)
- Note: this property is proposing several acres of +/- 78 acres commercial cannabis canopy. However, the well proposed for cultivation is off site (Well#4) on apn 013-027-08. (Appendix C)

WELL #4

- APN: 013-027-08 Owned HiCann LLC
- Well depth of 716 feet (Appendix A – 9/21/2020)
- Capacity of at 10 gpm per well driller's report
- Use: Irrigation Well
- Confined aquifer with thickness of 280 feet (85m)

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WELL RADIUS OF INFLUENCE

The well radius of influence (cumulative impact) is estimated by the Cooper-Jacob equation:

$$R_{(well)} = \sqrt{\frac{2.24584Tt}{S}}$$

Where,

$R_{(well)}$ = Radius of Influence (m)
t = time (seconds)
T = transmissivity (m^2 / day)
S = water storage capacity (%) unitless

$$T = K * b$$

Where,

K = 2.0 E-4 m/s for Basalt porosity
b = aquifer thickness, m
t = 1 day = 86,400 seconds
S = 0.15,

Therefore;

$R_{(1)}$ => 51m = 167 feet
$R_{(2)}$ => 56 m = 184 feet
$R_{(3)}$ => 29 m = 97 feet
$R_{(4)}$ => 148 m = 486 feet

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Based on the locations and the calculated Radius of Influences the project Well, Well#1 does not intersect with the wells in the area.

WATER USAGE

The proposed project has water usage for proposed canopy of 0.86 acres (37,446sf) and 2BR Dwelling Unit. For the purposes of this analysis, in an abundance of caution, we have assumed a canopy of 1.0 acres and water usage for 4 employees.

WATER USAGE FROM WELLS #1

The total water usage of the canopy area is estimated by the square footage of the canopy multiplied by the in/year needed for a singe cannabis plant. The in/yr is estimated to be similar to a tomato plant, which is 20in/year.

$$W_{Irrigation} = A * (ft/yr)$$

$W_{Irrigation}$ = (1.0 acres) * (43,560 sf/acres) * (1.66 ft/year) * (7.48 gal/cf)
= 540,875 gal/year

$W_{Domestic}$ = [(4 employees) * (15 gals/employee/day) * (0.7 days/week used)] + (2BR) * (1.5 person/BR) * 75gal/person/day)] * 365 days/year
= 97,455 gal/year

Total Water Usage = $W_{Irrigation}$ + $W_{Domesic}$
= 638,330 gal/year

AQUIFER RECHARGE

The proposed project has an estimated total annual water usage of 638,330 gallons per year.

Calculation of Aquifer Recharge is based on the tributary area to the radius of influence of the well. Because of the location of the wells near St. Helena Creek,

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the aquifer recharge is in two areas. Per map shown in Appendix D, the total recharge area is 277,989 sf.

Given: Annual Precipitation, P = 40 inches per year, assume a drought year is 20% of the annual precipitation, yields 8" (0.66ft) of rainfall. (Note: Rainfall of 2021 for lake county was 9" per NOAA)

Volume of water for recharge = Area x Drought Precipitation x Coefficient of Seepage.

V = (277,989 sf) x (0.66 ft/yr) x (7.48 gal/cf) x (0.7)

V = 960,663 gal/year

960,663 > 638,330 therefore the well is adequate to handle the 1.0 acres of cultivation in a drought year.

CONCLUSION

Per our calculations and assumptions, the project does have an adequate water supply for the proposed irrigation use. However, the project must be limited to 1 acre of canopy and irrigated with dripline only. Canopy size exceeding 1 acre will require the development of a new well(s).

Through our calculations, review of available Well Completion Reports and Pump Yield Tests, the proposed use of the well onsite does not interfere with surrounding wells.

The well on the property (apn: 14-006-17) will not be impacted by the Nina Star Farm because the well's radius of influence do not intersect. The distance between the well radius of the project well, and the neighboring well is approximately 186' based on our theoretical calculations noted in this report. The neighboring well has pump yield test of 1.5 gpm which is very poor. Per conversations with the owner, the well is near dry and water is delivered to the site during drought years (currently).

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Appendix

Well Completion & Test Results (A)

Well Area of Influence Map (B)

Surrounding Aerial Map (C)

Well Recharge Area (D)

Appendix

A

JAK Drilling & Pump

Well Drilling Pumps Water Treatment

Hole to Home

WELL #1

WELL PERFORMANCE TEST REPORT

Client Name: NinaStar LLC
Property Location: 23180 Shady Grove, Middletown, CA
Parcel Number: 014-006-16
Number of Wells Evaluated: One
Well Performance Test Completion Date: March 12, 2020
Water Samples Collected: No
Pump Technician: Jim Jackson

Location Description: 38.718582, -122.613146 (WGS84)
Total Depth: 43-feet below top of casing
Depth to Static Water Level: 10.33-feet below the top of casing
Diameter of well: 10-inches
Casing type: Steel
Test Duration: 2-hours
Test Type: Pump
Pumping Rate: 16-Gallons Per Minute (GPM)

Observations: JAK Drilling & Pump (JAK) performed a visual inspection of the well on March 12, 2020. The well is located on the northwest side of the access road that runs along the eastern edge of the property (see Well Location Map attached). There is an existing and operational ½-horse 230volt submersible pump, of unknown production specifications, installed in the well that is supplied power via connection to PG&E power supply.

Well Performance Pump Test: The four-hour pump test was conducted using the existing submersible pump and in accordance with industry standards. The static water level within the well was measured prior to the start of the test. Once the performance test began, the depth-to-water or pumping level was measured manually with a Powers Water Meter in the well every five minutes during the first half hour of the test and then every 10-minutes for the next hour of the test. The measurement interval was then increased to every 30-minutes for the remainder of the four-hour test. The pumping rate was measured by timing the flow into a volume verified 5-gallon bucket. The pumping rate was measured at the same intervals as the pumping level. Both the depth-to-water/pumping level and pumping rate measurements are summarized in the attached table.

The static water level was measured at 10.33-feet below the top of casing at the start of the performance test. The maximum drawdown of 1.5-feet at 11.83-feet below the top of casing was observed immediately after the start of the test. The pumping level remained constant at 11.83-feet below the top of casing for the duration of the test. The pumping rate, measured by timing

the flow into a volume verified 5-gallon bucket, remained a constant 16.0-GPM for the duration of the test. The performance test was concluded after the production rate and the pumping level remained constant for at least 2-hours.

After 2-hours of pumping, the well pump was shut off and the well was then allowed to rest and recharge. The depth-to-water was measured in the well after 10-minutes at 11.0-feet and then again after 30-minutes at 10.33-feet below the top of casing. The resulting recharge rate of 100% indicates the well has a strong recovery.

Disclaimer:
Observations made of the well(s) are strictly limited to the date and time that the test(s) was conducted and are in no way a guarantee of future conditions, including but not limited to the quantity and/or quality of the water produced by this well.

Please feel free to contact our office if there are any questions regarding the well test and/or well test report.

Sincerely,

Jessica Moreno
JAK Drilling & Pump

Attachments:
Well Location Map
Table 1: Well Performance Test Data

WELL LOCATION MAP

23180 Shady Grove

Middletown, CA

TABLE 1
WELL PERFORMANCE TEST DATA
23180 Shady Grove Rd, Middletown, CA
March 12, 2020

Time	Gallons Per Minute	Depth to Water In Feet Below Top of Casing
13:00	Static	10.33
13:05	16.00	11.83
13:10	16.00	11.83
13:15	16.00	11.83
13:20	16.00	11.83
13:25	16.00	11.83
13:30	16.00	11.83
13:40	16.00	11.83
13:50	16.00	11.83
14:00	16.00	11.83
14:10	16.00	11.83
14:20	16.00	11.83
14:30	16.00	11.83
15:00	16.00	11.83
15:10	RECHARGE	11.00
15:30	RECHARGE	10.33

Flow rate measured by timing flow into a volume confirmed 5-gallon bucket.

ORIGINAL
File with DWR

Page ___ of ___

STATE OF CALIFORNIA
WELL COMPLETION REPORT
Refer to Instruction Pamphlet

No. 713392

DWR USE ONLY — DO NOT FILL IN
10N/07W-15M
STATE WELL NO./STATION NO.
LATITUDE LONGITUDE
APN/TRS/OTHER

Owner's Well No. JAN 0 3 2000
Date Work Began 8-3-99 Ended 8-4-99
Local Permit Agency Health Dept.
Permit No. WE-1638 Permit Date 12-22-98

WELL #2

GEOLOGIC LOG

ORIENTATION (✓) X VERTICAL ___ HORIZONTAL ___ ANGLE ___ (SPECIFY)
DRILLING METHOD air rotary FLUID ___

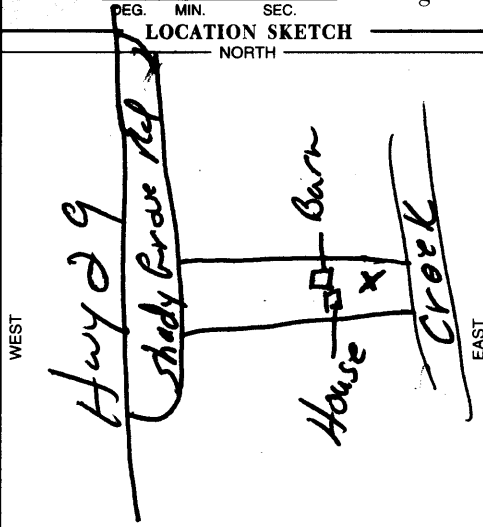
DEPTH FROM SURFACE Ft.	to Ft.	DESCRIPTION *Describe material, grain size, color, etc.*
0	10	Gravel
10	20	Sandstone
20	25	Shale
25	50	Sandstone
50	60	Shale
60	70	Sandstone
70	80	Shale
80	100	Sandstone
100	110	Shale
110	120	Sandstone
120	125	Shale

TOTAL DEPTH OF BORING 125 (Feet)
TOTAL DEPTH OF COMPLETED WELL 125 (Feet)

WELL LOCATION

Address 23250 Shady Grove Rd
City Middletown
County Lake
APN Book 14 Page 006 Parcel 17
Township 10N Range 7W Section 15
Latitude ___ DEG. ___ MIN. ___ SEC. NORTH
Longitude ___ DEG. ___ MIN. ___ SEC. WEST

LOCATION SKETCH



Illustrate or Describe Distance of Well from Roads, Buildings, Fences, Rivers, etc. and attach a map. Use additional paper if necessary. ***PLEASE BE ACCURATE & COMPLETE.***

ACTIVITY (✓)

X NEW WELL
MODIFICATION/REPAIR
___ Deepen
___ Other (Specify)
___ DESTROY *(Describe Procedures and Materials Under "GEOLOGIC LOG")*

PLANNED USES (✓)

WATER SUPPLY
X Domestic ___ Public
___ Irrigation ___ Industrial
MONITORING ___
TEST WELL ___
CATHODIC PROTECTION ___
HEAT EXCHANGE ___
DIRECT PUSH ___
INJECTION ___
VAPOR EXTRACTION ___
SPARGING ___
REMEDIATION ___
OTHER (SPECIFY) ___

WATER LEVEL & YIELD OF COMPLETED WELL

DEPTH TO FIRST WATER 50 (Ft.) BELOW SURFACE
DEPTH OF STATIC WATER LEVEL 35 (Ft.) & DATE MEASURED 8-4-99
ESTIMATED YIELD * 142 (GPM) & TEST TYPE air lift
TEST LENGTH 2 (Hrs.) TOTAL DRAWDOWN ___ (Ft.)
** May not be representative of a well's long-term yield.*

CASING (S)

DEPTH FROM SURFACE Ft.	to Ft.	BORE-HOLE DIA. (Inches)	TYPE (✓) BLANK	SCREEN	CONDUCTOR	FILL PIPE	MATERIAL / GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)
0	20	9	X				PVC SCH80	4½	160	
20	30	7	X				" "	"	"	
30	70	7		X			" "	"	"	18
70	125	7	X				" "	"	"	

ANNULAR MATERIAL

DEPTH FROM SURFACE Ft.	to Ft.	TYPE CEMENT (✓)	BENTONITE (✓)	FILL (✓)	FILTER PACK (TYPE/SIZE)
0	20	X			
20	125				#16 Pea
			JAN 25 2000		

ATTACHMENTS (✓)

___ Geologic Log
___ Well Construction Diagram
___ Geophysical Log(s)
___ Soil/Water Chemical Analyses
___ Other ___

ATTACH ADDITIONAL INFORMATION, IF IT EXISTS.

CERTIFICATION STATEMENT

I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief.

NAME Larry Herman Drilling (PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)
ADDRESS 12011 Hwy 29 CITY Lower Lake STATE Ca ZIP 95457
Signed Larry Herman (WELL DRILLER/AUTHORIZED REPRESENTATIVE) DATE SIGNED 8-4-99 C-57 LICENSE NUMBER 465071

DWR 188 REV. 11-97

IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

WELL #3

ORIGINAL

File with DWR

STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES
WATER WELL DRILLERS REPORT

Do not fill in
No. 094877

Notice of Intent No.
Permit No. or Date
A.P. 14-006

State Well No. ~~10N/10W-14~~
Other Well No. 10N/10W-14

(1) C
Address
City Zip

(2) LOCATION OF WELL (See instructions):
County Lake Owner's Well Number
Well address if different from above 23320 Shady Grove Rd.
Township Range Section
Distance from cities, roads, railroads, fences, etc.

(3) TYPE OF WORK:
New Well XX Deepening ☐
Reconstruction ☐
Reconditioning ☐
Horizontal Well ☐
Destruction ☐ (Describe destruction materials and procedures in Item 12)

(4) PROPOSED USE:
Domestic XX
Irrigation ☐
Industrial ☐
Test Well ☐
Stock ☐
Municipal ☐
Other ☐

WELL LOCATION SKETCH

(5) EQUIPMENT:
Rotary ☐ Reverse ☐
Cable XX Air ☐
Other ☐ Bucket ☐

(6) GRAVEL PACK:
Yes ☐ No XX Size
Diameter of bore
Packed from to ft.

(7) CASING INSTALLED:
Steel XX Plastic ☐ Concrete ☐

From ft.	To ft.	Dia. in.	Gage or Wall
0	26	10 3/4	.188

(8) PERFORATIONS:
Type of perforation or size of screen

From ft.	To ft.	Slot size
6	26	

(9) WELL SEAL:
Was surface sanitary seal provided? Yes ☐ No ☐ If yes, to depth ft.
Were strata sealed against pollution? Yes ☐ No ☐ Interval ft.
Method of sealing

(10) WATER LEVELS:
Depth of first water, if known ft.
Standing level after well completion 15 ft.

(11) WELL TESTS:
Was well test made? Yes XX No ☐ If yes, by whom?
Type of test Pump ☐ Bailer XX Air lift ☐
Depth to water at start of test ft. At end of test 20 ft
Discharge 10 gal/HR after 4 hours Water temperature
Chemical analysis made? Yes ☐ No ☐ If yes, by whom?
Was electric log made? Yes ☐ No ☐ If yes, attach copy to this report

(12) WELL LOG: Total depth 26 ft. Depth of completed well ft.

from ft.	to ft.	Formation (Describe by color, character, size or material)
XXXXXXXXXXXXXXXXXXXX		
0	15	boulders
15	25	blue shale rock
25	26	hard rock

Work started 7/27/81 19 Completed 7/30/81 19

WELL DRILLER'S STATEMENT:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.
SIGNED Ken Hansen (Well Driller)
NAME Les Petersen Drlg. & Pump, Inc. (Person, firm, or corporation) (Typed or printed)
Address 5434 Old Redwood Highway
City Santa Rosa, Ca. Zip 95401
License No. 261084 Date of this report 8/3/81

188 (REV. 7-76) IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

JAK Drilling & Pump

Well Drilling Pumps Water Treatment

Hole to Home

(707) 809-5525

WELL #4

WELL PRODUCTION REPORT

Client: HiCann LLC
Well Location: 22999 South State Highway 29, Middletown, CA
APN: 013-027-08
Location Description: 38.72181, -122.60500
Total Depth: 716-feet below ground surface (bgs)
Diameter of well: 5 inches
Casing type: PVC
Production Rate: 100-gallons per minute
Test Duration: 8-hours
Test Type: Airlifting
% Recharge: 100

Observations: JAK was retained by the client for the purpose of drilling and installing a new water well. The well has been drilled to a depth of 716-feet below ground surface using a mud-rotary style method of drilling. The well was cased to 716-feet using 5-inch PVC well casing with the annular space gravel packed and sealed per industry standards. As part of the well completion process, JAK airlifted the well for approximately 8-hours on November 28, 2020. Airlifting allows the driller to remove additional fines and sediments from the well that could potentially foul a submersible pump while also evaluating the production rate for the new well. Typically, when a pump test is completed, the pumping level (or water level) is measured in the well at set intervals for the duration of the test. However, due to the dynamic nature of airlifting it is impossible to measure the pumping level during the test therefore only the static water level and the recovery or recharge water level was measured. The water produced via airlifting was directed into a 5-inch discharge pipe temporarily connected to the well with the volume measured by timing the flow through a discharge weir.

Prior to airlifting, the static water level was measured at 46-feet below ground surface. The well was then airlifted for 8-hours and as expected, the volume of water produced from the well increased with the removal of the fine sediments. Initially the production rate of the well measured at 30-gallons per minute then as the clarity of the water improved the production rate increased to 100-gallons per minute. After 8-hours of airlifting the well was then allowed to rest and recharge. Following 30-minutes of inactivity the water level in the well was measured and at 44-feet below ground surface indicating that the well had fully recharged.

Disclaimer: Observations made of the well(s) are strictly limited to the date and time that the test(s) was conducted and are in no way a guarantee of future conditions, including but not limited to the quantity and/or quality of the water produced by this well.

Please feel free to contact our office if there are any questions regarding the well test and/or well test report.

Sincerely,

Jessica Moreno
Operations Manager
JAK Drilling & Pump

Attachments:
Well Location Map

Well Location

22999 South State Highway 29

Middletown, CA

State of California

Well Completion Report

Form DWR 188 Submitted 12/18/2020

WCR2020-017295

WELL #4

Owner's Well Number 1 | Date Work Began 09/21/2020 | Date Work Ended 11/29/2020

Local Permit Agency Lake County Health Services Department - Environmental Health Division

Secondary Permit Agency Lake County Health Services | Permit Number WP0003657 and WP0003559 | Permit Date 12/03/2020

Well Owner (must remain confidential pursuant to Water Code 13752)

Name HICANN LLC, Zarina Otchkova

Mailing Address 28592 N 68th Avenue

City Peoria | State AZ | Zip 85383

Planned Use and Activity

Activity New Well

Planned Use Water Supply Irrigation - Agriculture

Well Location

Address 22999 S State Highway 29 HWY

City Middletown | Zip 95461 | County Lake

Latitude 38 Deg. 43 Min. 18.5159 Sec. N | Longitude -122 Deg. 36 Min. 18 Sec. W

Dec. Lat. 38.72181 | Dec. Long. -122.605

Vertical Datum | Horizontal Datum WGS84

Location Accuracy Unknown | Location Determination Method GPS

APN 013-027-08

Township

Range

Section

Baseline Meridian

Ground Surface Elevation

Elevation Accuracy

Elevation Determination Method

Borehole Information

Orientation Vertical | Specify

Drilling Method Other - Hammer followed by mud rotary drilling | Drilling Fluid Bentonite

Total Depth of Boring 716 Feet

Total Depth of Completed Well 716 Feet

Water Level and Yield of Completed Well

Depth to first water 42 (Feet below surface)

Depth to Static Water Level 46 (Feet) | Date Measured 11/28/2020

Estimated Yield* 100 (GPM) | Test Type Air Lift

Test Length 8 (Hours) | Total Drawdown (feet)

*May not be representative of a well's long term yield.

Geologic Log - Free Form

Depth from Surface Feet to Feet		Description
0	26	red dirt rock
26	42	dark rock
42	280	First water encountered at 42', red and black fractured rock, hole fell apart at 280- switch and finish hole via mud drilling
280	300	basalt with quartz
300	330	basalt
330	338	fractured rock change to possible shale layer
338	400	shale changes to hard rock, hole is very grabby and mud thinning
400	410	Blue gray clays
410	415	shale rock clay
415	420	clays
420	430	clays with possible water
430	460	clay with iron and quartz with some basalt
460	500	thin layers of sandstone intermixed with iron, quartz, possible water at 500

500	540	quartz with iron
540	560	blue shale, with iron, quartz = possible water
560	580	quartz with iron and some basalt
580	610	quartz and basalt - possible water
610	620	brown clay, basalt and quartz
620	660	iron, quartz, basalt
660	680	iron, quartz, shale, basalt - Possible Water
680	700	basalt, sandstone - possible water
700	716	basalt

Casings

Casing #	Depth from Surface Feet to Feet		Casing Type	Material	Casings Specificatons	Wall Thickness (inches)	Outside Diameter (inches)	Screen Type	Slot Size if any (inches)	Description
1	0	80	Blank	PVC	N/A	0.214	4.5			Well Casing
1	80	100	Screen	PVC	N/A	0.214	4.5	Milled Slots	0.032	Screen
1	100	120	Blank	PVC	N/A	0.214	4.5			SOLID
1	120	140	Screen	PVC	N/A	0.214	4.5	Milled Slots	0.032	screen
1	140	160	Blank	PVC	N/A	0.214	4.5			Well casing
1	160	180	Screen	PVC	N/A	0.214	4.5	Milled Slots	0.032	Well Casing
1	180	200	Blank	PVC	N/A	0.214	4.5			Well Casing
1	200	220	Screen	PVC	N/A	0.214	4.5	Milled Slots	0.032	well casing
1	220	240	Blank	PVC	N/A	0.214	4.5			well casing
1	240	260	Screen	PVC	N/A	0.214	4.5	Milled Slots	0.032	well casing
1	260	280	Blank	PVC	N/A	0.214	4.5			well casing
1	280	300	Screen	PVC	N/A	0.214	4.5	Milled Slots	0.032	Well Casing
1	300	320	Blank	PVC	N/A	0.214	4.5			Well Casing
1	320	340	Screen	PVC	N/A	0.214	4.5	Milled Slots	0.032	Well Casing
1	340	360	Blank	PVC	N/A	0.214	4.5			Well Casing
1	360	380	Screen	PVC	N/A	0.214	4.5	Milled Slots	0.032	Well Casing
1	380	400	Blank	PVC	N/A	0.214	4.5			Well Casing
1	400	420	Screen	PVC	N/A	0.214	4.5	Milled Slots	0.032	Well Casing
1	420	480	Blank	PVC	N/A	0.214	4.5			Well Casing
1	480	500	Screen	PVC	N/A	0.214	4.5	Milled Slots	0.032	Well Casing
1	500	520	Blank	PVC	N/A	0.214	4.5			Well Casing
1	520	540	Screen	PVC	N/A	0.214	4.5	Milled Slots	0.032	Well Casing
1	540	560	Blank	PVC	N/A	0.214	4.5			well casing
1	560	580	Screen	PVC	N/A	0.214	4.5	Milled Slots	0.032	well casing
1	580	600	Blank	PVC	N/A	0.214	4.5			WELL CASING
1	600	620	Screen	PVC	N/A	0.214	4.5	Milled Slots	0.032	well casing
1	620	640	Blank	PVC	N/A	0.214	4.5			
1	640	660	Screen	PVC	N/A	0.214	4.5	Milled Slots	0.032	well casing
1	660	680	Blank	PVC	N/A	0.214	4.5			well casing
1	680	700	Screen	PVC	N/A	0.214	4.5	Milled Slots	0.032	well casing
1	700	716	Blank	PVC	N/A	0.214	4.5			cellar

Annular Material

Depth from Surface Feet to Feet		Fill	Fill Type Details	Filter Pack Size	Description
25	716	Filter Pack	Other Gravel Pack	Pea Gravel	double washed pea gravel
0	25	Bentonite	Other Bentonite		hydrated bentonite sanitary seal

Other Observations:
Initially began drilling boring using air hammer, hole started falling a part around 280-feet and had to switch to mud-rotary style of drilling. Cleared hole and continued drilling to terminal depth of 716-feet below ground surface.

Borehole Specifications

Depth from Surface Feet to Feet		Borehole Diameter (inches)
0	25	10.875
25	716	7.875

Certification Statement

I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief

Name: JAK DRILLING AND PUMP, Kharom Hellwege
(Person, Firm or Corporation)

PO Box 250 (Address) | Middletown (City) | CA (State) | 95461 (Zip)

Signed: *electronic signature received* (C-57 Licensed Water Well Contractor) | 12/18/2020 (Date Signed) | 1013957 (C-57 License Number)

Attachments

Well Production Report 11.30.2020.pdf - Other

DWR Use Only

CSG #	State Well Number	Site Code	Local Well Number

N — **Latitude Deg/Min/Sec**

W — **Longitude Deg/Min/Sec**

TRS:

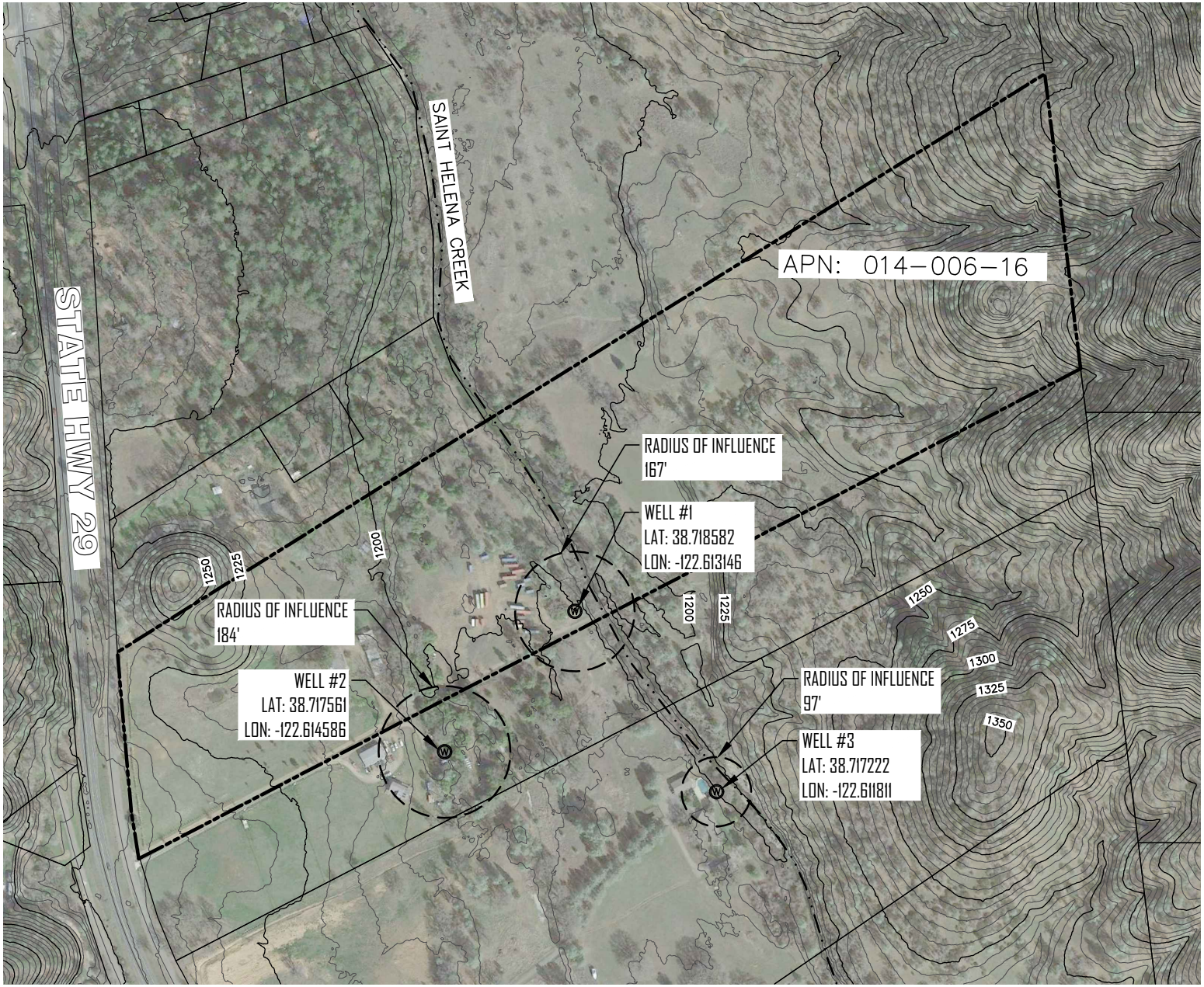
APN:

Appendix

B

Well Area of Influence Map

APPENDIX B



5' MINOR AND 25' MAJOR CONTOUR INTERVAL

0 400 800 Feet

SUBMITTED TO:
LAKE COUNTY COMMUNITY DEVELOPMENT DEPT.
COUNTY OF LAKE
LAKEPORT, CA

VanDerWall Engineering, Inc.
PO BOX 431
KELSEYVILLE, CA 95451
707-279-4887

WELL AREA OF INFLUENCE MAP
APN: 014-006-16
23180 SHADY GROVE
MIDDLETOWN, CALIFORNIA

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

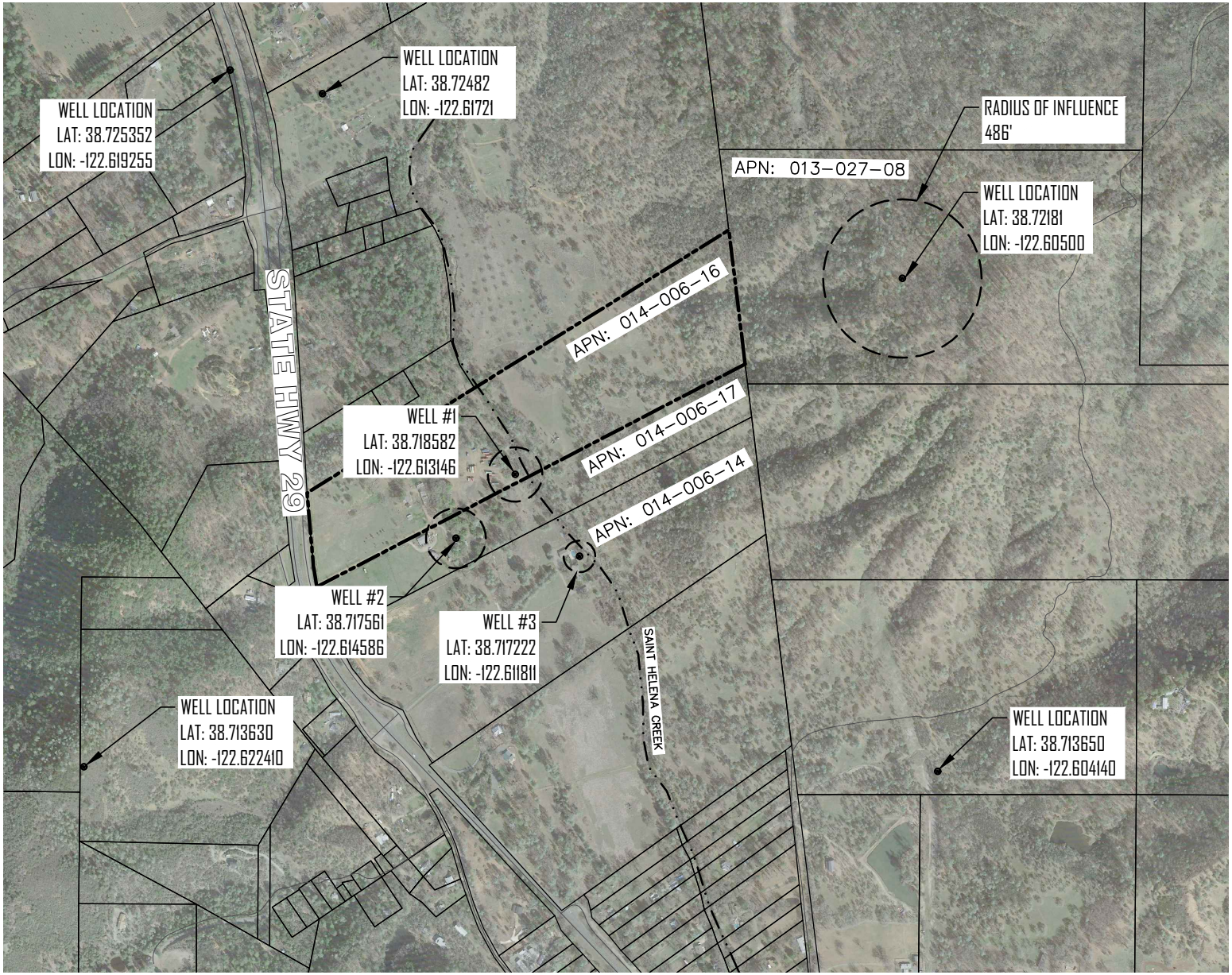
DATE	SEPT 2021
PROJ	21-51
DWG	
APPENDIX	B

Appendix

C

Surrounding Area Map

APPENDIX C



5' MINOR AND 25' MAJOR CONTOUR INTERVAL

0 900 1800 Feet

SUBMITTED TO:
LAKE COUNTY COMMUNITY DEVELOPMENT DEPT.
COUNTY OF LAKE
LAKEPORT, CA

VanDerWall Engineering, Inc.
PO BOX 431
KELSEYVILLE, CA 95451
707-279-4887

SURROUNDING AREA MAP
APN: 014-006-16
23180 SHADY GROVE
MIDDLETOWN, CALIFORNIA

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

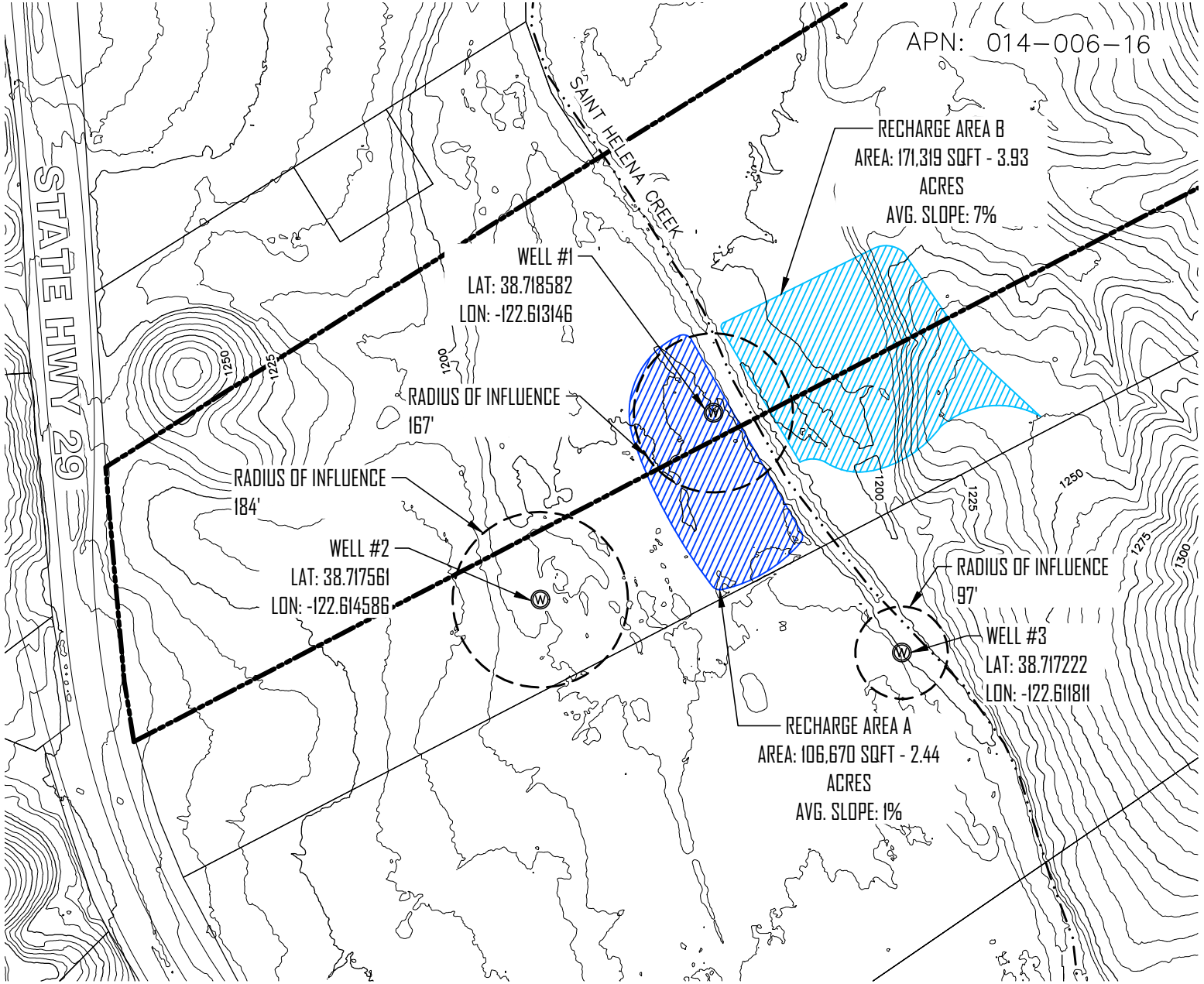
DATE	SEPT 2021
PROJ	21-51
DWG	
APPENDIX	C

Appendix

D

Well Recharge Area Map

APPENDIX D



5' MINOR AND 25' MAJOR CONTOUR INTERVAL

0 300 600 Feet

SUBMITTED TO:
LAKE COUNTY COMMUNITY DEVELOPMENT DEPT.
COUNTY OF LAKE
LAKEPORT, CA

VanDerWall Engineering, Inc.
PO BOX 431
KELSEYVILLE, CA 95451
707-279-4887

WELL RECHARGE AREA MAP
APN: 014-006-16
23180 SHADY GROVE
MIDDLETOWN, CALIFORNIA

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

DATE	SEPT 2021
PROJ	21-51
DWG	
APPENDIX	D

Drought Management Plan

Purpose

This Drought Management Plan has been prepared to fulfil the requirement for the Board of Supervisors Ordinance NO. 3106, adopted on July 27th, 2021. This plan is designed to conserve Lake County's water resources given the current emergency drought conditions. This plan has been created in combination with the previously submitted & reviewed Water Use Management Plan which outlined the proposed projects water use practices. The proposed methods aim to reduce water use by providing the most efficient delivery system and having as many preventative measures as possible in place to reduce to wasted water.

Methods to conserving water

The proposed projects most important aspect to reducing the amount of water used for irrigation is by utilizing drip irrigation directly into the root system of each plant. According to the USDA Natural Resources Conservation Service Irrigation Guide ("Irrigation Guide." USDA, Sept 1997, https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs144p2_033068.pdf) drip irrigation with proper water management, can be in the range of 80 to 90 percent effective for the area irrigated. Drip irrigation maximizes the efficiency by reducing the amount of water that is lost to evaporation as well as runoff. The greenhouses are fully enclosed so there is no potential for runoff, which allows for immediate recapturing of excess water underneath the cultivation beds to further maximize water use efficiency. Additionally, due to the greenhouses being fully enclosed they are capable of optimizing the internal environment. This means controlling the humidity and light level which reduces the amount of water needed to irrigate each plant.

The proposed project plans to supplement the soil with compost from the vegetative waste produced by the plants. The composted soils, elevated in nutrients will be mixed in the cultivation medium to further improve the soil health and ultimately increase its water-holding capacity. Mulch not only insulates and protects the lower soil levels from drying up, but also increases the rate of water absorption.

Water will only be delivered to the plants through the holding tanks and not directly from the well. The water storage tanks will be equipped with float valves to prevent overflow and runoff of irrigation water when full. Additionally, safety valves will be equipped to supply lines in case the flow of water needs to be stopped in an emergency situation.

Hydrology Report

The hydrology report was prepared by VanDerWall Engineering on September 6, 2021. Outlined below are key take away from the report, however for the full results please see the submitted hydrology report:

- The project does have an adequate water supply for the proposed irrigation use. However, the project must be limited to 1 acre of canopy and irrigated by dripline only.
- The proposed use of the well onsite does not interfere with surrounding wells.