

Attachment H:
R. Brown and Son Quarry Proposed Expansion Dewatering Plan (Preliminary)



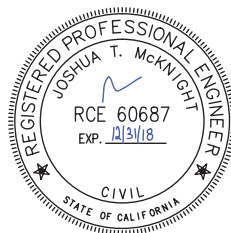
DEWATERING PLAN

**R. Brown & Sons Quarry
Quarry Expansion**

**Willow Creek, CA
APN: 316-061-011**

CLIENT:

**R. Brown & Sons Quarry
PO Box
Willow Creek, Ca 95573**



**November, 2018
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Job #154.11**



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INTRODUCTION

Trinity Valley Consulting Engineers (TVCE) was contracted by *R. Brown & Sons Quarry* (Owner) in order to provide a dewatering plan to be utilized during operation of the proposed expansion of the existing rock quarry on parcel number 316-061-011 in Willow Creek, Ca. The following is a summary of the existing conditions, proposed expansion, conclusions, and recommendations.

PROJECT DESCRIPTION

Proposed work at this location is the expansion of an existing quarry utilized for extraction of both rock armoring and aggregate rock. The existing quarry has been in operation since 1990, and covers approximately 20-25 acres in total area. The proposed expansion would add another 40-45 acres to the east of the existing operations. Operation of the quarry expansion is expected to take place over the next thirty years (see proposed reclamation plan).

NEED AND PURPOSE

The following report is necessary in order to develop a plan for dewatering the subsurface formations after excavation is complete. As no geologic borings are available for this location, and as such the makeup and configuration of the underlying formations is unknown. In order to provide the most stable final slope configuration given the information on hand, the following measures have been recommended:

- Reduce the final slope of the restored quarry site to 1.5:1
- Provide relief benches at intervals along the slope face
- Provide dewatering of the subsurface formation

The purpose of this plan is to provide a plan for dewatering of the subsurface formations after the quarry excavation is complete, as removal of the groundwater would significantly reduce the risk of future slope failure.



DEWATERING PLAN

The following is a plan for implementation of dewatering the subsurface formations of the expanded portion of the quarry after final grading is complete. Components of the plan are as follows:

Quarry Excavation and Final Grading

Operation of the expanded portion of the quarry will consist primarily of excavation of aggregate rock and rock slope protection. Once initial clearing and access roadways have been developed, excavation will be implemented per the approved grading plan for the project. Final slopes will be graded at an incline of 1.5:1 or flatter, with relief benches at regular intervals. Final grades will start at the top of the quarry, and progress downward to the final grades at the toe of the slope.

Horizontal Wells

As the quarry excavation progresses towards to its final grades, horizontal wells will be installed in order to provide the above mentioned subsurface dewatering. Horizontal wells shall be installed along the relief benches as they are constructed. Wells shall conform to the following minimum requirements:

- Pipe Diameter: Minimum 1.5"
- Depth: 150', or to groundwater level
- Spacing: Minimum of 50' on center
- Orientation: Perpendicular to the slope face
- Slope: Minimum of 5 degrees from horizontal – sufficient for gravity flow

Drilling of horizontal wells shall be performed in the presence of a Certified Engineering Geologist (CEG) who shall log the soils encountered and verify the adequacy of the methods and criteria to accomplish dewatering of the subsurface strata at the appropriate locations. The CEG may change, modify, or eliminate any of the above requirements depending on the results of the drilling. The CEG may also modify the operation of the quarry excavation and grading according to these findings.





Drainage

Once the wells are installed and functioning, dewatering will occur by gravity flow. Wells shall be plumbed to 3" galvanized iron pipe and flow off of the excavation face to the east of the project. Pipe will then be discharges into the quarry drainage system to ultimately flow to the stormwater detention system at the downgradient portion of the quarry. As this system is designed for flows to percolate into the subsurface soil, no discharge is anticipated to leave the project site.

CONCLUSION

The current grading plan and dewatering plan were developed utilizing the best information available at this time. Subsequent information obtained during quarry excavation and drilling horizontal wells could lead to modifications in the proposed plan. Regardless, the proposed plan is based on conservative estimates of the site conditions, and should provide adequate stability for the operation of the quarry expansion.

