

**San Mateo County Mid-Coast Aquifers:
Literature and Data Review**

Prepared for:

San Mateo County
Board of Supervisors

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April 2002

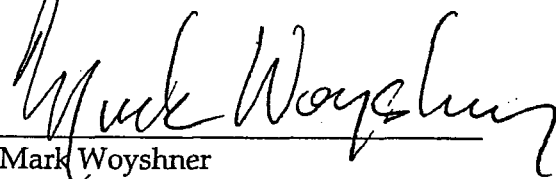
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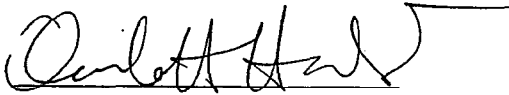
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Balance Project Assignment 201024

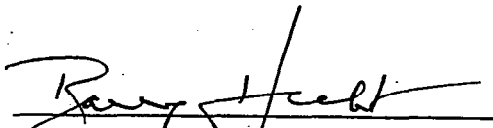
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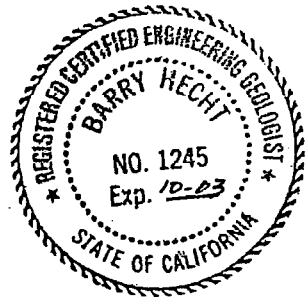
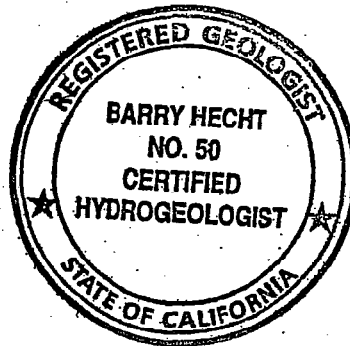
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1. SUMMARY

- The San Mateo County Board of Supervisors seeks to identify where and how much water may be safely taken from the ground, from Half Moon Bay north to Devils Slide, without posing significant risks during an extended drought to community health or environmental resources and values. This Phase I report identifies information sources, ground-water units and their boundaries. Phase II will analyze the data and develop alternatives and recommendations, with Phase III assessing their environmental effects under the California Environmental Quality Act (CEQA).
- In general terms, the region is characterized by coastal plains and narrow mountain valleys, underlain by loose, unconsolidated alluvial and coastal-terrace deposits formed largely from or filled with coarse- and medium-grained sand eroded from the granitic rocks of Montara Mountain. In most cases, wells draw water of low mineral content with relative ease from these valley (alluvial) aquifers and portions of the coastal plain composed primarily of weathered granitic materials.
- Lower and more variable yields are measured from wells developed in granitic bedrock, or in the consolidated gray siltstones and sandstones mapped primarily as Purisima formation. Wells in both types of bedrock can often yield sufficient water for individual homes, and in some areas can produce sufficient water for community supply. Ground water is generally of good quality, with mineral content typically lower than that found south of Highway 92 on the south coast of San Mateo County. Water drawn from the Purisima siltstones and sandstones generally contains the highest mineral content, which sometimes exceeds the maximum concentrations recommended for domestic water supply.
- To delineate the mid-coast aquifers, we employed a broad-reaching watershed approach that recognizes the close connection between the valley aquifers and the coastal plain, and the implied need to manage them conjunctively. In general, sub-basin boundaries followed the topographic catchment area for each valley-aquifer, extending to the top of the watershed divide; then catchments were grouped based on the associated coastal plain aquifer, which was delineated based on recognized or discernible ground-water divides and the nature of the aquifer materials. Four sub-basin groupings of valley and coastal-plain aquifers were identified:
 - a) Martini Creek south to Dean Creek, which includes Montara Creek;

- b) San Vicente south to Denniston Creek, including the airport aquifer;
 - c) El Granada area; and
 - d) Arroyo de en Medio south to Frenchmans Creek.
- Basic data describing aquifer properties are generally limited in the study area, mostly coming from driller's well logs, which vary widely in quality of data. Well logs describe how the well is constructed, the yield of the well and water-level drawdown when initially tested, in addition to descriptions of the geologic materials encountered during drilling. Additional data have been developed from only several dozen wells. Perhaps more than in other coastal basins with long records of aquifer response, greater efforts to collect and archive wells logs with consistent and more descriptive information on aquifer properties are warranted.
 - Well logs include short-duration (1-2 hour) drawdown information, generally collected following completion of the well, as part of the well development (clarification) process. Existing tests are often too brief to reasonably characterize the properties of the aquifer and performance of the well. In many parts of the Mid-Coast, longer-duration tests and consistent methodologies can provide data significantly more useful in assessing whether a well can sustain supply during multi-year droughts. Some of the most useful information was found in hydrologic studies either for a specific mid-coast basin or specific project in the study area.
 - The County is potentially interested in assessing with a reasonable level of assurance the performance of a well drilled at any specific location or the long-term capacity of an aquifer from which it draws water to provide domestic water supplies during drought periods. Subsequent phases of the investigation are intended to provide information and guidance for these issues. Given that the aquifer properties and the data used to evaluate aquifers vary widely across the region, and recent demand for domestic wells in close proximity to each other in an urbanized setting near the coast, the County might consider additional steps to assure that wells meet high standards for quantity, quality and long-term reliability, pending a more complete assessment of groundwater supplies and conditions in Phase II.

**Proposed changes to County Well Ordinance – April 2002
As discussed on April 22, 2002**

Current	Concern	Change	Impact/Gain
<p>Water sample is taken at unspecified time and transported to lab with no record of transport</p>	<p>Water quality sample is not representative of surrounding water. Stagnant water taken from the casing is not representative of the surrounding formation water.</p> <p>No record of custody is maintained to ensure QA/QC</p>	<p>The potable water sample shall be drawn from the pump at the conclusion of the pump test required by Section 4.68.190, and shall be transported to a State of California Certified laboratory under chain-of-custody</p>	<p>No fiscal impact.</p> <p>Water sample is representative of formation water.</p> <p>Sample integrity is maintained.</p>
<p>If water quality does not meet State maximum contaminant levels, treatment is allowed to meet levels.</p>	<p>By allowing treatment of water with high specific conductance and chlorides – the potential of introducing salt-water intrusion into the basis exists.</p>	<p>With the Midcoast, water treatment will not be considered in order to be certified if either the recommended State maximum contaminant levels for specific conductance or chloride are exceeded.</p>	<p>An unknown number of wells that currently would be certified for potable use with allowed treatment would not be receive a certificate for a building permit. Historic levels indicate the number of wells that will fail are in El Granada and Montara/Moss Beach sub-units.</p> <p>Will help protect against concerns for salt-water intrusion.</p>
<p>No definition for the term Midcoast exists in the Ordinance</p>		<p>Add definition of Midcoast (see attached)</p>	
<p>For domestic use wells performance standards exist only for quality and quantity.</p>	<p>The current quantity requirement does not address impacts to surrounding aquifer. How a well and aquifer “recover” after being pumped is an important aspect of water viability.</p>	<p>For all vertical wells in the Midcoast, said term shall also mean a well in which the water level within the well casing recovers to 80% or greater, of the initial level with the four hours immediately following the completion of the pump test.</p>	<p>An unknown number of wells will not meet these requirements and therefore would not receive a certificate for a building permit.</p> <p>Will allow a better understanding water availability and viability.</p>

Current	Concern	Change	Impact
<p>The driller or contractor performs pump test and reports the quality and quantity results to the county</p>	<p>There is no professional liability associated with the potential reporting of incorrect data. Drillers are not professionally qualified to interpret test results.</p>	<p>In the Midcoast, all pumping tests shall be performed by, or under the supervision of, a California Registered Geologist, and certified by signature of the same</p>	<p>Increased cost of \$1,000 to \$3,000 per well installation. Give professional liability and credibility to results.</p>
<p>Pumping tests are performed year round</p>	<p>By allowing pumping tests in the "wet season" a true aquifer production and response may not be shown. Tests should stress the aquifer</p>	<p>For all vertical wells in the Midcoast, the pumping test shall be performed July 15 through November 30.</p>	<p>Limits time for contractors to perform these tests. Should be no fiscal impact to property owner. An unknown number of wells will not meet the requirements during this part of the year. Stresses the aquifer to further ensure a viable well.</p>
<p>During pumping tests the water level in the well may fall below sea level</p>	<p>Well level draw below mean sea level may contribute to eventual salt-water intrusion into the aquifer</p>	<p>For all vertical wells in the Midcoast, the pump test shall not allow the water level to be drawn below mean sea level</p>	<p>An unknown number of wells will not meet these requirements and therefore would not receive a certificate for a building permit. This will help protect against concerns surrounding salt-water intrusion.</p>

DRAFT
ORDINANCE NO. _____
BOARD OF SUPERVISORS, COUNTY OF SAN MATEO,
STATE OF CALIFORNIA

* * * * *

AN URGENCY ORDINANCE AMENDING CHAPTER 4.68 (WELLS) OF THE SAN MATEO COUNTY ORDINANCE CODE RELATING TO STANDARDS FOR DOMESTIC WELLS IN THE UNINCORPORATED MIDCOAST AREA

The Board of Supervisors of the County of San Mateo, State of California, ORDAINS as follows:

SECTION 1. FINDINGS: Chapter 4.68 (Wells) of the San Mateo County Ordinance Code defines the standards for determining “adequate water” for wells serving single family dwellings in the unincorporated area of the county. It has been recommended by a subcommittee of the Board of Supervisors and staff to amend these standards to address concerns over contamination and saltwater intrusion in domestic wells and to ensure the sustainability of wells as a domestic water source in the unincorporated Midcoast area of the County.

SECTION 2. San Mateo County Ordinance Code section 4.68.020 of chapter 4.68, Wells, is hereby amended to read as follows:

4.68.020 Definitions.

The following definitions govern the construction of this chapter:

(a) “Abandoned well” means any of the following:

- (1) A water supply well which has not been used for a period of one calendar year and has not been permitted as an inactive well by the County Health Officer.
- (2) A monitoring or contamination extraction well which has not been used for a period of three calendar years and has not been permitted as an inactive well by the County Health Officer.
- (3) A well which is in such a state of disrepair that it cannot be made operational for its intended purpose.
- (4) A test hole or exploratory boring 24 hours after construction and testing work has been completed.

(5) A cathodic protection well that is no longer functional for its original purpose.

(b) "Agricultural well" or "stock well" means any well used solely to supply water for irrigation or other agricultural purposes.

(c) "Cathodic protection well" means any well designed or used to protect pipelines, tanks, cables, power lines and other facilities from corrosion.

(d) "County Health Officer" means the Environmental Health Director of San Mateo County or an authorized representative. The County Health Officer or his or her designee shall have the authority and responsibility for the enforcement of this chapter.

(e) "Domestic water supply" means a system consisting of a well, storage tank(s), reservoirs, integrated piping or other related appurtenances used for the purposes of delivering potable water intended for human consumption. Except as otherwise provided by this chapter, this term shall include any water well, agricultural well, industrial well or other type of well which is used to provide potable water for human consumption.

(f) "Dwelling unit" means a room or suite of two (2) or more rooms, which are designed for, intended for, or are occupied by one family doing its cooking therein and having only one kitchen.

(g) "Exploratory well" means a test production well installed for the purpose of assessing well water quantity and quality.

(h) "Inactive well" means a well that has been properly secured, protected and maintained in an inactive condition in accordance with state requirements, for a period not to exceed five years.

(i) "Geothermal heat exchange well" means any artificial excavation by any method for the purpose of using the heat exchange capacity of the earth for heating and/or cooling and in which the ambient ground temperature is 86 degrees Fahrenheit or less and which uses a closed loop fluid system to prevent the discharge or escape of its fluid into the surrounding aquifers or geologic formations. Geothermal heat exchange wells are also known as ground source heat pump wells. Such wells or boreholes are not intended to produce water or steam.

(j) "Midcoast" means that portion of unincorporated area in the Coastal Zone on the urban side of the midcoast urban-rural boundary as shown in the County General Plan and those lands designated as Rural Residential Areas by the Local Coastal Program (LCP) Policies 1.13 - 1.15.

(k) "Nonresidential water use" means a potable water supply which serves the public in a commercial setting that is not subject to surface water contamination.

(l) "Observation and monitoring well" means any artificial excavation by any method for the purpose of obtaining groundwater, vadose zone, or other subsurface data, including groundwater levels, groundwater quality, and soil vapor quality. Monitoring wells shall conform with applicable California Department of Water Resources, U.S. Environmental Protection Agency, State Department of Toxic Substance Control, or the Regional Water Quality Control Board standards and guidelines for the construction of monitoring wells.

(m) "Person" means any individual, organization, partnership, business, association, corporation or governmental agency.

(n) "Potable water" means water that complies with standards for transient noncommunity water systems pursuant to the California Safe Drinking Water Act (Chapter 4, commencing with section 116275 of part 12).

(o) "Property line" means the legally established line separating one piece of property from another or separating a public-right-of-way from private properties.

(p) "Sewer" means a pipe carrying wastewater from any structure or a part of a community or individual sewerage system.

(q) "Spring" means a place where groundwater flows naturally from rock or soil onto the land surface and is not subject to surface water contamination.

(r) "Stabilized water level during pumping" means that level of water in the well which remains constant after a period of pumping at the specified rate in gallons per minute provided under section 4.68.190 of this chapter. The required period of time for such pumping may vary at the discretion of the Health Officer depending upon the geological factors and groundwater recharge of the site. The minimum test period for individual domestic wells shall be four hours after the water level is stabilized.

(s) "Well" or "water well" means any artificial excavation by any method for the purpose of extracting water from, or injecting water into, the underground. This definition shall include agricultural wells and monitoring and observation wells. This definition shall not include: (1) oil and gas wells, or geothermal wells constructed pursuant to state law except those wells converted to use as water wells; or (2) wells used for the purpose of (A) Dewatering excavations during construction; or (B) stabilizing hillsides or embankments.

SECTION 3. San Mateo County Ordinance Code section 4.68.180 of chapter 4.68, Wells, is hereby amended to read as follows:

468.180 Certification for building permit.

Upon the completion of the construction or conversion of a well in compliance with the provisions of this chapter, the County Health Officer shall, upon request, certify the well as a domestic water supply for one to four dwelling units or for industrial or commercial use for the purpose of obtaining a building permit to construct a new structure or for the enlargement of an existing structure if the well provides a water supply that is potable, adequate and delivered under a minimum pressure of twenty (20) pounds per square inch during periods of maximum demand. The potable water sample shall be drawn from the pump at the conclusion of the pump test required by Section 4.68.190, and shall be transported to a State of California certified laboratory under custody seal. Within the Midcoast water treatment will not be considered in order to be certified if either the State minimum standards for specific conductance or chloride are exceeded. A certification issued pursuant to this Section shall be valid only for the purposes of obtaining a building permit and is not and shall not be deemed a permit to use or operate a well as a domestic water supply as may be required by Sections 4.68.210 through 4.68.280

SECTION 4. San Mateo County Ordinance Code section 4.68.190 of chapter 4.68, Wells, is hereby amended to read as follows:

4.68.190 Standards for adequate water.

For the purposes of this article, "adequate water" means:

- (1) For a vertical well serving a single family dwelling, said term shall mean a well, which produces a minimum of 2 ½ gallons per minute for four consecutive hours with at least 1,250 gallons of emergency storage.
- (2) For a vertical well serving a single family dwelling with the second unit less than 750 square feet, said term shall mean a well which produces a minimum of 3 gallons per minute for four consecutive hours with at least 1,500 gallons of emergency storage.
- (3) For a vertical well serving two to four dwelling units, said term shall mean a well which produces at a minimum at a stabilized water level during pumping:
 - (A) Five gallons per minute for four consecutive hours with 2,500 gallons of emergency storage for two dwelling units.
 - (B) 7.5 gallons per minute for four consecutive hours with 3,750 gallons of emergency storage for three dwelling units.

(C) Ten gallons per minute for four consecutive hours with 5,000 gallons of emergency storage for four dwelling units.

(4) For all vertical wells in the Midcoast, said term shall also mean a well in which the water level within the well casing recovers to 80%, or greater, of the initial level within the four hours immediately following the completion of the pumping test.

(5) For a horizontal well or spring serving a single family dwelling, said term shall mean a well or spring that produces a minimum flow of 2.5 gallons per minute with minimum storage of 1,250 gallons after 30 days of observation or if done in the dry period, August 1 through November 30, 1.5 gallons per minute for a thirty-day observation period and 2,000 gallons of storage.

(6) In the Midcoast, all pumping tests shall be performed by, or under the supervision of, a California Registered Geologist, and certified by signature of the same.

(7) For all vertical wells in the Midcoast, the pump test shall be performed from July 15 through November 30.

(8) For all vertical wells in the Midcoast, the pump test shall not allow the water level to be drawn below mean sea level.

(9) For nonresidential uses, said term shall mean an amount of water determined by the County Health Officer in accordance with the Uniform Plumbing Code and water quality standards issued by the California Department of Health Services.

SECTION 5. San Mateo County Ordinance Code section 4.68.320 of chapter 4.68, Wells, is hereby amended to read as follows:

A variance from the specific terms of this chapter may be granted by the County Health Officer when, due to special conditions or exceptional circumstances of the property, its location or surroundings, a literal enforcement of this chapter would result in unnecessary hardships. A variance cannot be approved if it would be contrary to the intent of this chapter or harm public health, safety or welfare. Applications for a variance shall be made in writing and filed with the County Health Officer with the request for a permit or certificate provided by this chapter. No variance shall be granted from the application of sections 4.68.180 and 4.68.190 to domestic wells located in the Midcoast.

SECTION 6. This ordinance is an urgency ordinance and shall be effective immediately upon passage. The Board of Supervisors finds that there is a current and imminent threat to the public health and welfare from the use of domestic wells in the unincorporated Midcoast area of the County under existing well standards due to the potential for saltwater intrusion contaminating aquifers within the area and the uncertainty of the continued adequacy of groundwater supplies pending completion of the second phase of the Midcoast Groundwater Study in mid-2004. The report on Phase 1 of the Midcoast study has just been issued and identifies potential concerns. However, due to the complexity of geological conditions in the Midcoast, it is difficult to identify the exact locations for concern. It is anticipated that more definitive information on these locations and recommended standards will be available when the report on Phase 2 of the study is concluded. The standards promulgated by these amendments are based upon information known to date and establish interim performance-based measures that are sufficiently rigorous to protect against the concerns raised in the Phase 1 report. They will also provide a better understanding of water availability and viability until the Phase 2 report is completed. Immediate action is further necessary given the facts that most well drilling takes place during the summer and fall and the new standards will only allow pump tests for wells in the Midcoast area during the dry period, between July 15 and November 30, thus, making it imperative that the new standards go into effect as soon as possible for calendar year 2002.

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