

## APPENDIX E: ASSUMPTIONS AND RATIONALE USED TO EVALUATE MUN PROJECT ALTERNATIVES

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Each MUN project alternative was evaluated as to how well it satisfies each criterion. A scale of “low”, “medium”, and “high” was used to rank how well an alternative meets a criterion. The low, medium, and high rankings are characterized as follows:

Low	Alternative largely does not satisfy criterion
Medium	Alternative satisfies criterion, in part
High	Alternative largely satisfies criterion

### ***Criterion 1: Maintain consistency with federal and state water quality laws and policies.***

No Action (MUN Alt 1): Alternative would maintain consistency. **HIGH**

De-designate with No Vertical Boundary (MUN Alt 2): No vertical boundary to de-designation area would likely result in future potential impacts to MUN beneficial use in down-gradient areas where it currently may exist; i.e., at some shallow vertical depths within the Upper Tulare Formation's unconfined aquifer down-gradient, as no barrier to vertical migration of groundwater exists down-gradient of the de-designation area within the Upper Tulare Formation, which could allow high salinity production water to migrate down-gradient over time and potentially impact MUN designated groundwater. This would be inconsistent with federal and state water quality laws and policies. **LOW**

MUN De-designation (SDWP EXC 1a MUN Alt 3): Alternative would maintain consistency. **HIGH**

MUN SSOs (MUN Alt 4): Alternative would maintain consistency. **HIGH**

### ***Criterion 2: Meet exception(s) to Sources of Drinking Water Policy***

No Action (MUN Alt 1): Existing groundwater quality within MUN de-designation boundary has EC levels greater than 3,000 mg/L TDS (5,000 µS/cm) and meets Exception 1a, but this alternative does not recognize this fact. **LOW**

De-designate with No Vertical Boundary MUN Alt 2): No vertical boundary to de-designation area would likely result in potential future impacts to MUN beneficial use down-gradient where it currently may exist within the unconfined aquifer of the Upper Tulare Formation; i.e., at some vertical depths and some distance down-gradient where groundwater EC is less than 5,000 µS/cm and does not meet Exception 1a of the Sources of Drinking Water Policy. **LOW**

MUN De-designation SDWP EXC 1a within the Proposed Vertical Boundaries (MUN Alt 3): Alternative meets Exception 1a of Sources of Drinking Water Policy. **HIGH**

MUN SSOs (MUN Alt 4): All groundwater within MUN de-designation boundary has EC levels greater than 5,000 µS/cm, but this alternative does not recognize this fact and would establish SSOs. **LOW**

***Criterion 3: Protect existing and future potential beneficial uses.***

No Action (MUN Alt 1): Alternative would protect existing and future potential beneficial uses as currently required by the Basin Plan. **HIGH**

De-designate with No Vertical Boundary (MUN Alt 2): Due to the lack of a vertical confining layer within the Upper Tulare Formation within the proposed de-designation zone, no vertical boundary within the de-designation area would likely result in potential future impacts to MUN beneficial use down-gradient of the project area, where it currently may exist; i.e., at some vertical depth within the unconfined aquifer portion of the Upper Tulare Formation, downgradient of the project area where groundwater EC is less than 5,000 µS/cm and does not meet Exception 1a of the Sources of Drinking Water Policy. **LOW**

MUN De-designation SDWP EXC 1a within the Proposed Vertical Boundaries (MUN Alt 3): No existing use of groundwater is being made and no future use is anticipated within the proposed de-designation zone. Furthermore, the Mid-Tulare Clay that denotes the upper boundary of the proposed de-designation boundary forms an impermeable hydrologic barrier to the upward flow of groundwater from confined conditions below the clay to unconfined conditions above the clay. The low vertical conductivity of this clay layer suggests that there is very little, if any, upward flow of groundwater. This alternative would protect existing and future potential beneficial outside of the proposed de-designation boundary, especially down-gradient. **HIGH**

MUN SSOs (MUN Alt 4): Alternative would protect existing and future potential beneficial uses as currently required by the Basin Plan. **HIGH**

***Criterion 4: Assure compliance with all WQOs outside of project boundaries.***

No Action (MUN Alt 1): Alternative would assure compliance with all WQOs outside of the project area. **HIGH**

De-designate with No Vertical Boundary. (MUN Alt 2): Potential exist for impacts from the proposed de-designation zone to down-gradient groundwater within the unconfined aquifer of the Upper Tulare Formation due to the lack of a distinct confining layer. **LOW**

MUN De-designation SDWP EXC 1a within the Proposed Vertical Boundaries (MUN Alt 3): as above in MUN Alt 1. **HIGH**

MUN SSOs (MUN Alt 4): as above in MUN Alt 1. **HIGH**

***Criterion 5: Maintain agricultural production in the project area.***

No Action (MUN Alt 1): Under this alternative, agricultural discharges would continue to be regulated under the ILRP and be required to comply with MUN beneficial use compliance criteria, as required under the ILRP, therefore agricultural production would remain the same as is currently being produced. **HIGH**

De-designate with No Vertical Boundary (MUN Alt 2): If MUN beneficial use is no longer designated within the proposed de-designation boundary from the surface down, and since there are no existing IND or PRO uses in the project area, there are no beneficial uses to be protected. To this end, under this alternative, agricultural production could be maintained in the project area. **HIGH**

MUN De-designation SDWP EXC 1a within the Proposed Vertical Boundaries (MUN Alt 3): as above. **HIGH**

MUN SSOs (MUN Alt 4): Under this alternative, agricultural discharges would not be allowed to cause or contribute to ambient groundwater quality exceeding a SSO. Discharges causing or contributing to ambient conditions exceeding a SSO and/or causing or contributing to degradation above that which is allowed in the Basin Plan would be prohibited. Thus, agriculture would need to implement additional treatment and control of its discharge to reduce its impact on groundwater or would need to reduce agricultural production in the area (i.e., fallow acreage). **LOW**

***Criterion 6: Has potential to improve salinity management outside of the project area.***

No Action (MUN Alt 1): The need to protect MUN beneficial use within the current production water injection zone (proposed de-designation zone) and to limit degradation in the Southern Lost Hills Oilfield would preclude or significantly limit the potential import of salt from outside of the project area for disposal in the project area. **LOW**

De-designate with No Vertical Boundary (MUN Alt 2): If MUN beneficial use is no longer designated within the proposed de-designation boundary, and since there are no existing IND or PRO uses in the project area, there are no beneficial uses to be protected. To this end, additional salt from outside the project area could be imported to the project area without harming beneficial uses in the project area. However, potential exists for impacts to beneficial uses down-gradient of the project area, due to lack of a confining layer in the unconfined aquifer above the Mid-Tulare Clay within the Tulare Formation. This lack of a confining layer could allow for injected, high salinity production water from the project area to migrate down-gradient in the future to areas, where it could potentially impact beneficial uses that currently exist. Any project from outside of the project area that sought to discharge salt to the project area would need to undergo its own evaluation to determine if its discharge met all applicable federal and state water quality laws and policies. **MED**

MUN De-designation SDWP EXC 1a within the Proposed Vertical Boundaries (MUN Alt 3): Under this alternative, additional salt from outside the project area could be imported to the project area without harming beneficial uses within the project area, while still protecting beneficial uses down-gradient of the project area due to the presence of the Mid-Tulare Clay confining layer. **HIGH**

MUN SSOs (MUN Alt 4): MUN and AGR beneficial uses would need to be protected under this alternative, thus resulting in measures to prevent or limit groundwater degradation. The import of salt from outside of the project area for disposal in the project area would be precluded or significantly restricted. **LOW**

***Criterion 7: Technically feasible, economically viable, and reasonable action.***

No Action (MUN Alt 1): Agricultural discharges would still be required to protect MUN beneficial use as required under the ILRP, as all groundwater within the proposed de-designation boundary would still carry the MUN beneficial use designation, and Seneca would continue to retain potential Proposition 65 related liability, regardless of existing poor groundwater quality within the proposed de-designation zone that does not support MUN beneficial use. **LOW**

De-designate with No Vertical Boundary (MUN Alt 2): If the MUN beneficial use is no longer designated within the proposed de-designation boundary from the surface down, and since

there are no existing IND or PRO uses in the project area, there are no beneficial uses to be protected. However, due to the lack of a vertical confining layer within the unconfined aquifer of the Upper Tulare Formation, groundwater within the de-designation boundary could migrate down-gradient of the proposed de-designation zone and potentially impact groundwater that currently supports MUN and AGR beneficial uses, therefore, this alternative only partially satisfies the criterion in that the potential future impact of groundwater that currently supports the MUN and AGR beneficial uses is not reasonable. **MED**

MUN De-designation SDWP EXC 1a within the Proposed Vertical Boundaries (MUN Alt 3): If the MUN beneficial use is no longer designated within the proposed de-designation boundaries, and since there are no existing IND or PRO uses in the project area, there are no beneficial uses to be protected within the proposed vertical zone. Under this alternative, MUN and AGR use would still be protected in the shallow, unconfined aquifer zone and surface discharges would still be regulated under the ILRP ( for agricultural discharges) and other Central Valley Water Board programs, such as the Oil Fields Regulatory Program (for oil field related surface discharges), but Seneca would no longer retain Proposition 65 related liabilities. This alternative is considered to be feasible, economically viable, and reasonable. **HIGH**

MUN SSOs (MUN Alt 4): Under this alternative, agricultural discharges would not be allowed to cause or contribute to ambient groundwater quality exceeding a SSO. Discharges causing or contributing to ambient conditions exceeding a SSO and/or causing or contributing to degradation above that which is allowed in the Basin Plan would be prohibited. Thus, agriculture would need to implement additional treatment and control of its discharge to reduce its impact on groundwater or would need to reduce agricultural production in the area (i.e., fallow acreage). **LOW**

***Criterion 8: Scientifically supported by existing data.***

No Action (MUN Alt 1): Findings of the Revised Technical Report (RTR) show that groundwater quality, as measured by EC, within the proposed MUN de-designation boundary exceeds 5,000  $\mu\text{S}/\text{cm}$  and therefore, meets Exception 1a of the Sources of Drinking Water Policy. Additionally, the RTR found that groundwater within the proposed MUN de-designation boundary has not historically, is not currently, and is not anticipated to be used for municipal and domestic supply in the future. Groundwater quality within the proposed MUN de-designation boundary does not support the MUN beneficial use, and an action by the Central Valley Water Board to protect the MUN beneficial use is not scientifically supported by existing data. **LOW**

De-designation with No Vertical Boundary (MUN Alt 2): Groundwater within the proposed dedesignation zone boundary, as indicated in the RTR, exceeds 5,000  $\mu\text{S}/\text{cm}$  and therefore, meets Exception 1a of the Sources of Drinking Water Policy, however, due to the lack of a vertical confining layer within the Upper Tulare Formation, groundwater down-gradient of the proposed de-designation boundary that currently supports MUN beneficial use could potentially be impacted by groundwater migrating from the unconfined aquifer portion of the proposed de-designation zone (within the Upper Tulare Formation) in this alternative. As there is the potential to degrade groundwater quality that currently may support the MUN beneficial use, this alternative is not scientifically supported by existing data. **LOW**

MUN De-designation SDWP EXC 1a within the Proposed Vertical Boundaries (MUN Alt 3): The findings of the RTR show that groundwater quality within the proposed MUN de-designation boundary exceeds 5,000 and therefore, meets Exception 1a of the Sources of Drinking Water Policy. Additionally, the RTR found that groundwater within the proposed MUN de-designation boundary has not historically, is not currently, and is not anticipated to be used for municipal

and domestic supply. Groundwater quality within the proposed MUN de-designation boundary does not support the MUN beneficial use, and an action by the Central Valley Water Board to de-designate the MUN beneficial use within the proposed MUN de-designation boundary is scientifically supported by existing data. **HIGH**

MUN SSOs (MUN Alt 4): The findings of the RTR show that groundwater quality within the proposed MUN de-designation boundary exceeds 5,000 µS/cm and therefore, meets Exception 1a of the Sources of Drinking Water Policy. Additionally, the RTR found that groundwater within the proposed MUN de-designation boundary has not historically, is not currently, and is not anticipated to be used for municipal and domestic supply. Groundwater quality within the proposed MUN de-designation boundary does not support the MUN beneficial use, and an action by the Central Valley Water Board to protect the MUN beneficial use through the establishment of SSOs is not scientifically supported by existing data. **LOW**

***Criterion 9. Support socioeconomic well-being of the project area.***

No Action (MUN Alt 1): Same response as given for E7. **LOW**

De-designation with No Vertical Boundary (MUN Alt 2): Same response as given for E7. **MED**

MUN De-designation SDWP EXC 1a within the Proposed Vertical Boundaries (MUN Alt 3): Same response as given for E7. **HIGH**

MUN SSOs (MUN Alt 4): Same response as given for E7. **LOW**

***Criterion 10: Ease of implementation.***

No Action (MUN Alt 1): Under this alternative, Central Valley Water Board staff would continue to regulate dischargers in the Southern Lost Hills Oilfield to protect MUN and AGR beneficial uses under the ILRP. **HIGH**

De-designation with No Vertical Boundary (MUN Alt 2): This alternative would be easy to implement as it would remove MUN beneficial use from all groundwater located within the proposed horizontal boundary. However, due to the lack of a vertical confining layer within the Upper Tulare Formation's unconfined aquifer portion of the proposed de-designation zone, it would also likely result in potential future impacts to shallow groundwater situated downgradient of the project area, where MUN beneficial use is currently supported by existing groundwater quality and would require monitoring. **MED**

MUN De-designation SDWP EXC 1a within the Proposed Vertical Boundaries (MUN Alt 3): This alternative would require the least amount of effort by Central Valley Water Board staff to implement, as agricultural dischargers would still be subject to current ILRP requirements and oilfield dischargers would still be required to comply with the Oilfield General orders as currently being implemented. **HIGH**

MUN SSOs (MUN Alt 4): This alternative would require Central Valley Water Board staff to develop SSOs and a monitoring and surveillance program in the project area to evaluate if SSOs are being met. The involvement of Enforcement Division staff may also be necessary. **LOW**