

APPENDIX E

Soils

In the portions of the HST project corridor within the geographic limits of Merced County, soils are dominated by level to gently sloped ($\leq 3\%$) alluvial silts loams, sandy loams and clay loams derived from granitic, basaltic and andesitic parent material. The ten most common mapped NRCS soil types by area in the Merced County portion of the HST are:

- Atwater loamy sand (AgA)- 225 acres
- Honcut silt loam (HtA)- 528 acres
- Lewis loam (LkA)- 291 acres
- Lewis silty clay loam (LpA)- 375 acres
- Madera fine sandy loam (MaA)- 323 acres
- Madera sandy loam (MdA)- 191 acres
- Wyman clay loam (WoA)- 181 acres
- Wyman loam (WrA)- 175 acres
- Wyman loam, deep over hardpan (WsA)- 197 acres
- Yokohl clay loam (YbA)- 297 acres

In the portion of the APE falling within the geographic limits of Madera County, soils are dominated by level to gently sloped ($\leq 3\%$) alluvial loams with significant sand components including loams, sandy loams, fine sandy loams and loamy sands. These soils are generally derived from granitic parent material. The ten most common mapped NRCS soil types by area in the Madera County portion of the HST are:

- Cometa sandy loam (CuB)- 954 acres
- Grangeville fine sandy loam, over Traver soils (GcA)- 982 acres
- Hanford fine sandy loam, moderately deep and deep over silt (HdA)- 323 acres
- Madera fine sandy loam (MaA)- 564 acres
- Pachappa fine sandy loam (PaA)- 344 acres
- Ramona sandy loam (RaA)- 617 acres
- San Joaquin sandy loam (SaA)- 3609 acres
- Traver loam, slightly saline-alkali (TmA)- 356 acres
- Traver loam, moderately saline-alkali (TnA)- 565 acres
- Tujunga loamy sand (TwA)- 718 acres

In the portion of the APE falling within the geographic limits of Fresno County, soils are dominated by level to gently sloped ($\leq 3\%$ slope) alluvial sandy loams, loams and loamy sands. These soils are generally derived from granitic parent materials. The ten most common soil types by area found within the Fresno County portion of the APE are:

- Delhi loamy sand (DhB)- 136 acres
- Exeter sandy loam, shallow (Et)- 33 acres
- Exeter loam (Ex)- 30 acres
- Greenfield sandy loam, moderately deep (GuA)- 67 acres
- Hanford coarse sandy loam (Ha)- 8 acres
- Hanford sandy loam (Hc)- 68 acres
- San Joaquin sandy loam (ScA)- 105 acres
- San Joaquin sandy loam, shallow (SdA)- 166 acres
- San Joaquin loam, shallow (SgA)- 19 acres
- Tujunga loamy sand (TzbA)- 17 acres

Table E-1
Soil Series and Mapped Soils in the HST Project Corridor (OSD, WSS)

Alamo	P	MD	Fine textured mixed source alluvium	Nearly level basins, drainage ways, fan remnants and floodplains
AaA – Alamo clay, 0-1% slope AsA ³ – Alamo clay, 0-1% slope				
Atwater	W	VD	Granitic alluvium	Gently undulating to rolling dunes
AfA – Atwater loamy sand, 0-3% slope AgA – Atwater loamy sand, deep over hardpan, 0-3% slope AtA – Atwater loamy sand, 0-3% slope AtB – Atwater loamy sand, 3-8% slope AwA- Atwater loamy sand, moderately deep and deep over hardpan, 0-3% slope				
Bear Creek	MW-SP	-	Medium textured mixed alluvium	Nearly level narrow alluvial fans and floodplains
BcA – Bear Creek loam, 0-3% slope				
Borden	MW-W	-	Slightly calcareous ⁴ stratified granitic alluvium	Gently sloping older alluvial fans and basin rims
BeA – Borden fine sandy loam, 0-2% slope BfA – Borden fine sandy loam, 0-1% slope BkA – Borden fine sandy loam, slightly saline-alkali, 0-1% slope BmA – Borden loam, 0-1% slope				
Burchell	SP	-	Alluvium derived from slates and basic igneous rocks	Low poorly drained parts of alluvial fans on minor streams on the east side of the northern and central San Joaquin Valley
BkA – Burchell silt loam, slightly saline-alkali, 0-1% slope BmA – Burchell silt loam, moderately saline-alkali, 0-1% slope BnA – Burchell silt clay, 0-1% slope BpA – Burchell silt clay loam, slightly saline-alkali, 0-1% slope BrA – Burchell silt clay loam, moderately saline-alkali, 0-1% slope				
Cometa	MW-W	MD	Granitic alluvium	Gently sloping and undulating slightly dissected older stream terraces
CuB – Cometa sandy loams, 3-8% slope				
Delhi	SE	VD	Wind modified granitic alluvium	Floodplains, alluvial fans and terraces
DeA – Delhi sand, 0-3% slope DeB – Delhi sand, 3-8% slope DfA – Delhi sand, moderately deep and deep over hardpan, 0-3% slope DhA – Delhi loamy sand, 0-3% slope DhB – Delhi loamy sand, 3-9% slope				
Exeter	MW	MD	Mainly granitic alluvium	Hummocky, undulating to gently rolling fans and stream terraces
Es – Exeter sandy loam, 0-2% slope Et – Exeter sandy loam, shallow, 0-2% slope Ex – Exeter loam, 0-2% slope				
Fresno	MW	-	Granitic alluvium	Nearly level valley plains with an irregular low hummocky microrelief
FpA – Fresno loam, slightly saline-alkali, 0-1% slope FrA – Fresno loam, moderately saline-alkali, 0-1% slope FsA – Fresno loam, strongly saline-alkali, 0-1% slope				

¹ SE (somewhat excessive); W (well); MW (moderately well); SP (somewhat poorly); P (poorly)

² VD (very deep); D (deep); MD (moderately deep); S (shallow)

³ Soil survey map symbols (e.g. “AsA”, “BkA”, etc.) are not consistent across counties thus “BkA” can refer to a Borden series soil in one county and a Burchell series soil in another.

⁴ Relatively alkaline.

Grangeville	SP	VD	Moderately coarse textured mixed (granite dominated) alluvium	Alluvial fans and floodplains
GaA – Grangeville fine sandy loam, 0-1% slope GcA – Grangeville fine sandy loam, over Traver soils, 0-1% slope				
Greenfield	W	D	Coarse granitic and mixed rock alluvium	Fans and terraces
GeA – Greenfield sandy loam, deep over hardpan, poorly drained variant, 0-1% slope GfA – Greenfield sandy loam, deep over hardpan, 0-3% slope GrA – Greenfield coarse sandy loam, 0-3% slope GsA – Greenfield fine sandy loam, 0-3% slope GuA – Greenfield sandy loam, moderately deep, 0-3% slope GvA – Greenfield sandy loam, moderately deep and deep over hardpan, 0-3% slope				
Hanford	W	VD	Coarse granitic alluvium	Stream bottoms, floodplains and alluvial fans
Ha – Hanford coarse sandy loam HaA – Hanford fine sandy loam, 0-1% slope HbA – Hanford fine sandy loam, moderately deep and deep over hardpan, 0-1% slope Hc – Hanford sandy loam, 0-2% slope Hd – Hanford sandy loam, benches, 3-8% slope HdA – Hanford fine sandy loam, moderately deep and deep over silt, 0-3% slope HeA – Hanford sandy loam, 0-1% slope HeB – Hanford gravelly sandy loam, 3-8% slope HfA – Hanford sandy loam, 0-3% slope HgA – Hanford sandy loam, moderately deep and deep over hardpan, 0-3% slope Hl – Hanford gravelly sandy loam, 0-2% slope Hm – Hanford fine sandy loam, 0-2% slope Ho – Hanford fine sandy loam, silty substratum, 0-2% slope				
Hesperia	W	VD	Granitic and related alluvium	Smooth alluvial fans and valley fill
Hst – Hesperia fine sandy loam, moderately deep, 0-2% slope				
Honcut	W	VD	Moderately coarse igneous and granitic alluvium	Floodplains and moderately sloped alluvial fans
HrA – Honcut fine sandy loam, 0-1% slope HtA – Honcut silt loam, 0-1% slope HuA – Honcut silt loam, deep over hardpan, 0-1% slope HwA – Honcut silty clay loam, 0-1% slope				
Hopeton	MW	-	Alluvium	Terraces
3HA – Hopeton clay loam, 0-3% slope				
Keyes	W-MW	S	Material weathered from andesitic valley fill (e.g. gravels, cobbles and tuff)	Fans, terraces and hills with mound, intermound microrelief
KaB – Keyes gravelly clay loam, 0-8% slope KbB – Keyes gravelly loam, 0-8% slope KcB – Keyes-Pentz gravelly loam, 0-8% slope				
Landlow	SP	-	Moderately fine alluvium derived from igneous, metamorphic and sedimentary rock	Nearly level basins of valley plains
LaA – Landlow clay, 0-1% slope LbA – Landlow clay, slightly saline-alkali, 0-1% slope LeA – Landlow silty clay loam, 0-1% slope LfA – Landlow silty clay loam, slightly saline-alkali, 0-1% slope				
Lewis	MW	MD	Mixed rock alluvium	Terraces, basins and valley plains
LhA – Lewis clay, moderately saline-alkali, 0-1% slope LkA – Lewis loam, slightly saline-alkali, 0-1% slope LmA – Lewis loam, moderately saline-alkali, 0-1% slope LnA – Lewis loam, strongly saline-alkali, 0-1% slope LoA – Lewis silty clay loam, slightly saline-alkali, 0-1% slope LpA – Lewis silty clay loam, moderately saline-alkali, 0-1% slope LrA – Lewis silty clay loam, strongly saline-alkali, 0-1% slope				

Madera	MW-W	MD	Old granitic alluvium	Hummocky, gently sloping to undulating terraces
MaA – Madera fine sandy loam, 0-3% slope MbA – Madera loam, 0-1% slope MdA – Madera sandy loam, 0-3% slope MdB – Madera sandy loam, 3-8% slope				
Marguerite	W	-	Alluvium derived from metamorphic rock	Alluvial fans
MeA – Marguerite loam, 0-1% slope MfA – Marguerite silty clay loam, 0-1% slope MgA – Marguerite silty clay loam, deep over hardpan, 0-1% slope				
Montpellier	W-MW	D-VD	Old granitic alluvium	Nearly level to hilly dissected terraces
MrA – Montpellier coarse sandy loam, 0-3% slope MrB – Montpellier coarse sandy loam, 3-8% slope				
Pachappa	W	-	Coarse textured alluvium	Gently sloping alluvial fans under annual grass-herb vegetation
PaA – Pachappa fine sandy loam, 0-1% slopes PbA – Pachappa fine sandy loam, slightly saline-alkali, 0-1% slope				
Pentz	W	S	Material weathered from weakly consolidated basic andesitic tuffaceous sediments	Hills with mound, intermound microrelief and hill backslopes
PkB – Pentz gravelly loam, 0-8% slope				
Pollasky	W	MD	Soft to moderately consolidated arkosic ⁵ residuum	Undulating to hilly or steep dissected alluvial terraces
PmC – Pollasky sandy loam, 9-15% slope PnC – Pollasky fine sandy loam, 9-15% slope				
Porterville	W	D	Fine textured alluvium from igneous rock	Alluvial fans and foothills
PwA – Porterville clay, 0-3% slope				
Ramona	W	-	Granitic and related alluvium	Nearly level to moderately steep terraces and fans
RaA – Ramona sandy loam, 0-3% slope				
Raynor	W	-	Residuum weathered from sedimentary rock	Terraces
RaA – Raynor clay, 0-3% slope RaB – Raynor clay, 3-8% slope				
Redding	W-MW	MD	Mixed source alluvium	Nearly level or dissected and undulating to hilly high terraces
ReB – Redding gravelly loam, 0-8% slope				
Ryer	W	D	Alluvium weathered from igneous rock	Fairly old terraces
RsA – Ryer clay loam, 0-2% slope RtA – Ryer silt loam, 0-3% slope				
San Joaquin	W-MW	MD	Mixed (granite dominated) alluvium	Hummocky, nearly level to undulating terraces
SaA – San Joaquin sandy loam, 0-3% slope SbA – San Joaquin loam, 0-3% slope ScA – San Joaquin sandy loam, 0-3% slope ScB – San Joaquin sandy loam, 3-8% slope SdA – San Joaquin sandy loam, shallow, 0-3% slope SdA – San Joaquin-Alamo complex, 0-3% slope SeA – San Joaquin loam, 0-3% slope SgA – San Joaquin loam, shallow, 0-3% slope				

⁵ Sandstone composed of feldspar and quartz

Seville	MW	MD	Basic igneous alluvium	Nearly level alluvial fans, stream terraces and valley fill
SgA – Seville clay, 0-3% slope				
Snelling	W	VD	Primarily granitic alluvium	Level to moderately steep terraces
SnA – Snelling sandy loam, 0-3% slope				
Traver	MW-SP	-	Granitic alluvium	Nearly level to depressionally slightly hummocky areas on alluvial fans and floodplains
TmA – Traver loam, slightly saline-alkali, 0-1% slope TnA – Traver loam, moderately saline-alkali, 0-1% slope TnA – Traver fine sandy loam, slightly saline-alkali, 0-1% slope ToA – Traver loam, strongly saline-alkali, 0-1% slope ToA – Traver fine sandy loam, moderately saline-alkali, 0-1% slope				
Tujunga	SE	VD	Granitic alluvium	Alluvial fans and floodplains
TuA – Tujunga sand, 0-3% slope TwA – Tujunga loamy sand, 0-3% slope TwB – Tujunga loamy sand, 3-8% slope TzB – Tujunga and Hanford ⁶ soils, channeled, 0-8% slope TzbA – Tujunga loamy sand, 0-3% slope TzeB – Tujunga soils, channeled, 0-9% slope				
Visalia	W	-	Granitic alluvium	Alluvial fans
VaA – Visalia fine sandy loam, 0-1% slope				
Whitney	W	-	Granitic alluvium	Undulating, rolling and hilly areas and dissected old terraces
WkB – Whitney sandy loam, 3-8% slope WkD2 – Whitney sandy loam, 15-30% slope, eroded WmB2 – Whitney and Rocklin soils, 3-8% slope, eroded				
Wunje	MW-W	-	Granitic alluvium	Nearly level to channeled floodplains and recent alluvial fans
WvA – Wunje very fine sandy loam, moderately saline-alkali, 0-1% slope WxA – Wunje very fine sandy loam, strongly saline-alkali, 0-1% slope				
Wyman	W	D	Andesitic and basaltic alluvium	Old stream terraces and old alluvial fans
WnA – Wyman clay loam, deep over hardpan, 0-1% slope WoA – Wyman clay loam, 0-3% slope WpA – Wyman loam, deep over hardpan, slightly saline-alkali, 0-1% slope WrA – Wyman loam, 0-3% slope WsA – Wyman loam, deep over hardpan, 0-3% slope				
Yokohl	W	-	Alluvium derived from igneous rocks	Gently sloping old fans and terraces
YbA – Yokohl clay loam, 0-3% slope YcA – Yokohl loam, 0-3% slope				
Yolo	W	-	Fine loamy sedimentary alluvium	Nearly level to moderately sloping alluvial fans
YdA – Yolo loam, 0-1% slope				

⁶ See Hanford Series entry.