Michael T. Mahoney

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CINDY MCCALL
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P.O. BOX 8001
LOMPOC, CALIFORNIA 93438-8001

SEPTEMBER 12, 2003

RE: H STREET PINE TREE ASSESSMENT

Dear Ms. McCall,

This letter summarizes the results of my inspections to determine the health and stability of Italian stone pines (*Pinus pinea*) growing in the city right of way in the 200, 300, and 400 blocks of H Street and 2nd Street in the City of Lompoc. Several ancillary documents are included here, including:

- A collection of annotated photographs of selected trees on H Street
- A spreadsheet listing of 60 tree locations with attributes and assessments to express current conditions related to this study
- A collection of graphs produced in conjunction with measurements of internal wood decay and deterioration performed using a Resistograph – an instrument developed to measure decay in trees

The study arises from an incident occurring in August of 2003. In the early morning hours on a calm day one of three major scaffold limbs of the large Italian stone pine located in the public right of way at 228 H Street broke off and fell into the street. The wound produced by this broken limb exposed a combination of characteristics that appear to have predisposed the limb failure. These characteristics include:

- An external pocket that formed at the junction or bifurcation of the three codominant major scaffold limbs
- Bark extending down from the bifurcation so as to be included deep within the internal woody tissues of the tree bole (lower trunk portion)
- A cavity of decay beneath the pocket and within the bole that is associated with cracks and included bark

It may also be inferred that long horizontal limbs and heavy limb end weight intensified the condition by exerting a load amount that exceeded the mechanical 'holding capacity' of this multi-stemmed tree.

The methodology applied to this assessment included visual inspection of each tree from the ground level with attention to the planter/parkway environment and root crown of each tree, the tree trunk and noting bark characteristics and major wounds, careful investigation of the nature and character of major scaffold limb division or bifurcation, presence, if any, of specific direction of lean of the tree or extension of long horizontal limbs and their potential for impact on the surrounding environment, and the characteristics of the tree canopy. Trees with pockets at the location of scaffold limb bifurcation, or with unusual vertical bark seams and/or included bark were selected for additional study by performing one or more measurements of the internal wood density using a Resistograph 500®.

Long horizontal limbs are characteristic of Italian stone pines, and, while these conditions may have a detrimental impact on a tree's stability, it is common for the species to persist for many years (indeed, in many cases they exist a lifetime) with this typical horizontal limb pattern. Nevertheless, it is possible to reduce risk in especially conspicuous trees by applying routine pruning treatments to minimize limb length and/or reduce end weight. In this regard, several comments have been made in line item listings of the spreadsheet about long horizontal limbs and end weight, and routine pruning treatments are warranted for most of these trees whether or not specific mention has been made in the line item listing.

2013 FAILURE

* Three of the trees (located at 231 H Street- north tree, 236, and 326- north tree) have been found to exhibit external and internal conditions that are very similar to those of the tree at 228 H Street prior to its failure. I believe that no reasonable treatments can be performed to adequately diminish the potential risk and preserve the health, stability, and the aesthetic appeal of the tree, and that these trees should be removed to preserve public safety.

One tree (322 H Street) has many of the suspect characteristics, but was too large for investigation using the Resistograph. Measures should be taken to significantly 'unload' this tree, and artificial support mechanisms might be considered to mitigate its apparent poor structure. Consideration may also be warranted for its removal even though visible proof that the destructive features have manifested has not been provided in this study.

Seven trees exhibit characteristics indicating that harmful conditions are progressing. These trees might be treated, if desirable, or the trees may also be considered for removal. These are: 210, 214, 231– south tree, 303, 310– north tree, and 322 H Street. In addition, several trees measured with the Resistograph do not appear to be significantly impacted by these conditions at this time. These are: 306, 320, 331- south tree, and 430.

? 408, 411 + 415 S. H ST

As of the time of the field study for this report, half of the trees have one or more attributes that merit attention to avoid potential risk beyond the concerns for the type of failure that occurred at 228 H Street. In many cases these attributes simply require monitoring for sudden changes or worsening of the condition. These are: 200- north tree, 200- south tree, 201- north tree, 201- south tree, 215- north tree, 220, 223, 227, 238, 302, 310- south tree, 311- north tree, 323- north tree, 323- south tree, 335, 105 Olive (corner of Olive and H – on H), 400, 403- north tree, 403- south tree, 408, 411- north tree, 412, 415, 423- north tree, 423- south tree, 426, 434, 436- north tree, 436- south tree, and 439 H Street.

Finally, fifteen additional trees do not appear to have characteristics that might result in the type of failure that occurred at 228 H Street or other significant challenges at this time (other than those indicated on the spreadsheet). These are: 211, 215- south tree, 222, 237, 307, 311- south tree, 319, 326- south tree, 330, 331- north tree, 404, 411- south tree, 420, 429, and 435 H Street. It is important to note, however, that conditions in the field are 'fluid', and those circumstances that impact tree stability may evolve and changes can occur with regard to potential risks from trees.

I hope you find this information helpful in assisting to make the important decisions about dealing with these challenging tree issues. If I can be of further assistance please do not hesitate to contact me.

Yours truly,

Michael T. Mahoney, registered consulting arborist

American Society of Consulting Arborists * No. 353 *

Enc: Photographic references (9 pages)
Spreadsheet (2 pages)
Annotated Resistograph graphs (5 over-sized pages)

Photo references

Above right: the tree located at 200 H Street (north tree). The upper canopy of this tree is somewhat atypical - shorter and stubbier than others. Note the twisted growth of the trunk (red arrow)

Middle right: the tree located at 200 H Street (north tree). The twisting pattern extends for the entire length of the trunk.

Below right: the tree located at 200 H Street (north tree). In addition to the twisting pattern, the trunk has significant kinks, and a large wound low in the bole. These and some of the other characteristics found in other trees along H Street are not equivalent to the conditions that led to tree failure at 228 H Street, but they merit monitoring.

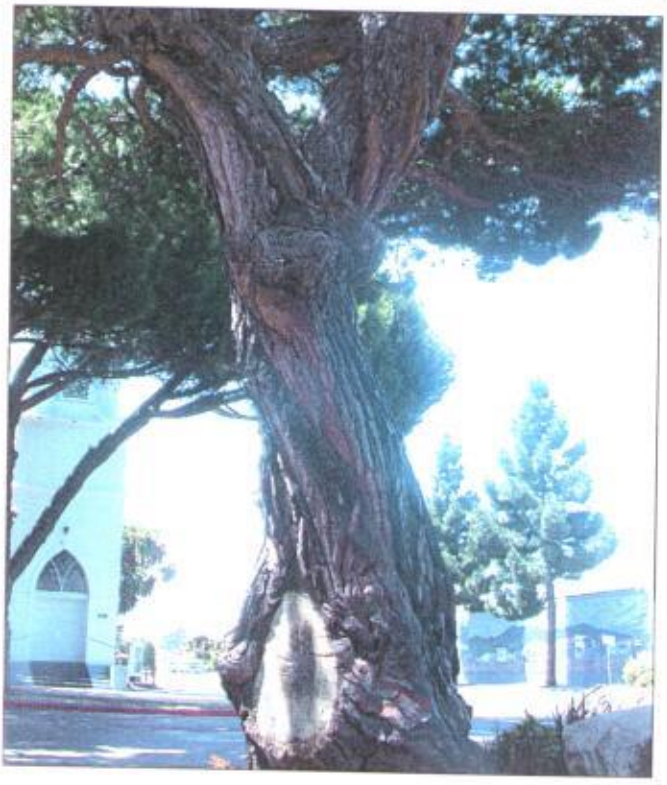
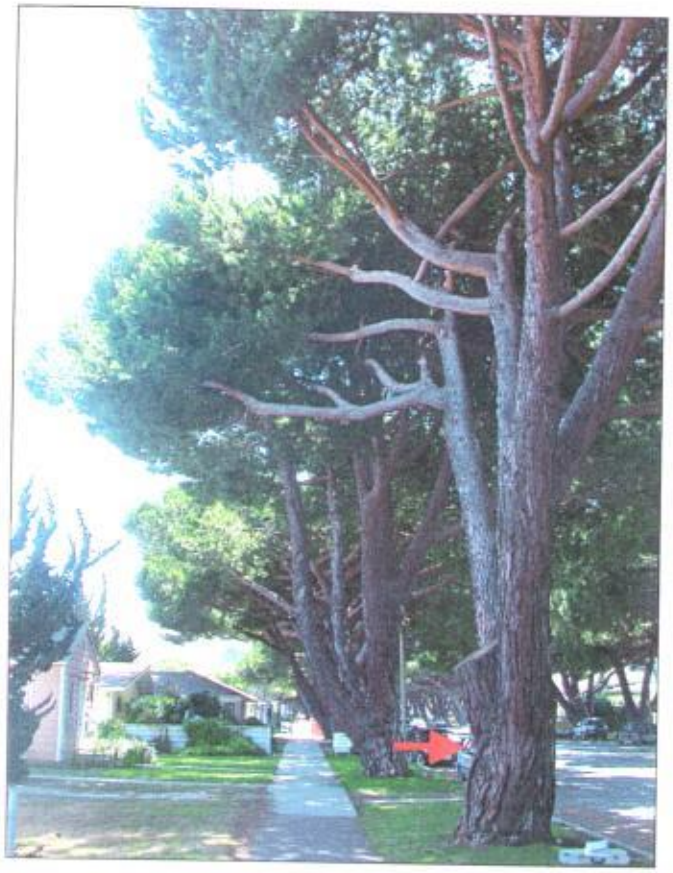


Photo references

Above right: the tree located at 210 H Street. Resistograph measurements were taken of this tree at the location indicated (red arrow). Note the lopsided canopy occurring as a result of removal of one of the major scaffold limbs. That treatment has to some extent mitigated potential limb failure in the manner of 228 H Street.



Below right: the tree located at 214 H Street. The soil is excessively moist here and other challenging factors exist in addition to the presence of those conditions similar to 228 H Street.

Photo references

Above right: the tree located at 228 H Street. Photo provided by city staff.

Below right: the tree located at 228 H Street. Additional photo provided by city staff.

Photo references

Above right: the tree located at 231 H Street (north tree). This tree has many of the challenging characteristics of the tree that failed at 228 H Street.

Below right: the tree located at 231 H Street (south tree). The long vertical seam (long vertical arrows) is associated with a pocket of decay. One Resistograph measurement was taken

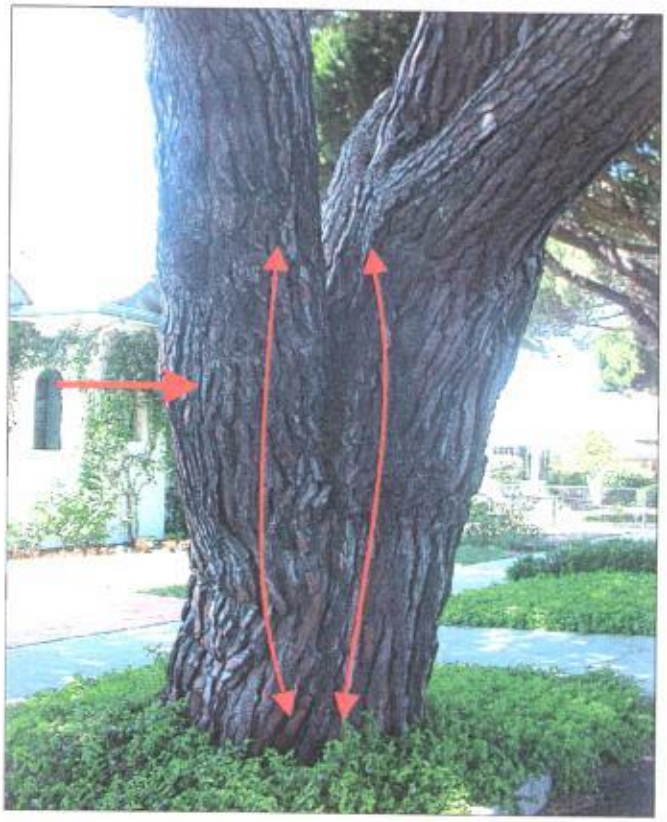


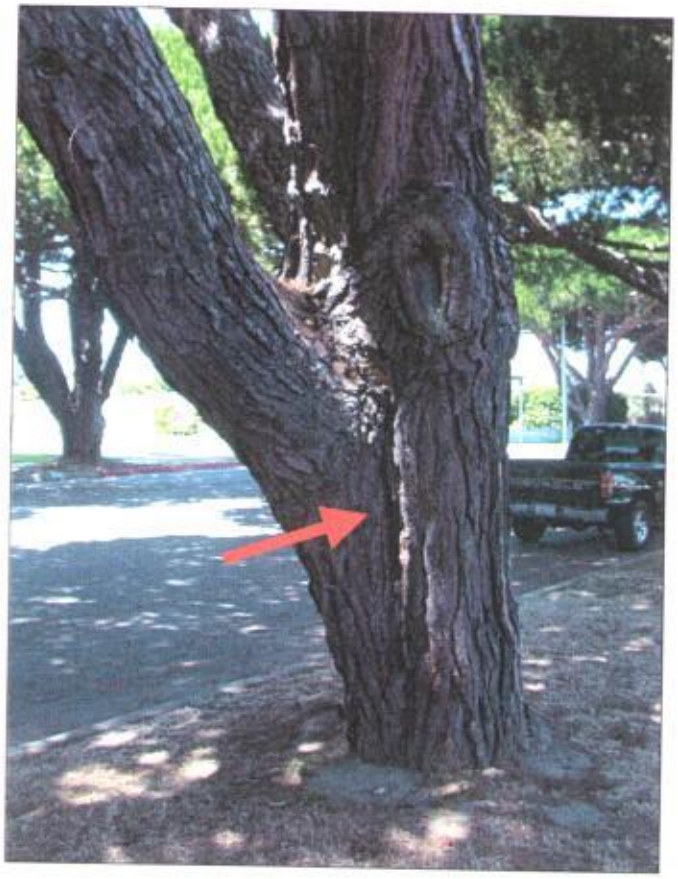
Photo references

Above right: the tree located at 236 H Street (south tree). Two Resistograph measurements were taken, as indicated.

Below right: the tree located at 303 H Street. Two Resistograph measurements were taken, as indicated.

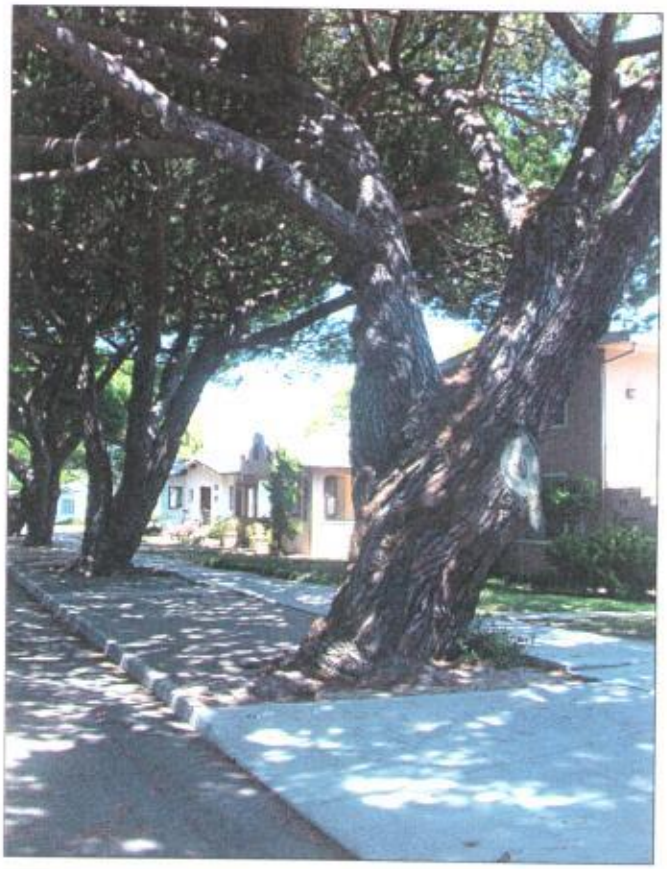
Photo references

Above right: the tree located at 306 H Street. Note the large vertical seam (red arrow). A measurement was taken to determine if an internal crack has formed. None was found.



Below right: the tree located at 310 H Street (north tree). This tree has a significant pocket of decay and 3 Resistograph measurements (red arrows) indicate that conditions are developing that are similar to those at 228 H Street.

Photo references



Above right: the tree located at 310 H Street (south tree). This tree leans precariously toward the driveway. While no pocket of decay was found, it should be monitored regularly for potential root failure and other physical attributes that appear challenging.

Below right: the tree located at 322 H Street. This tree is too large to take meaningful measurements with the Resistograph. Note the suspicious seam with a pocket at its upper junction – several Coast live oak seedlings are growing in the pocket.

Photo references

Above right: the tree located at 326 H Street (south tree). Several of these major limbs have narrow crotches that have apparently grafted together. The associated seams in the bark pattern suggest alignment of force flow through the tree and into the root crown.

Below right: the tree located at 335 H Street. Several limbs recently broke away in the canopy of this tree. (red arrow)

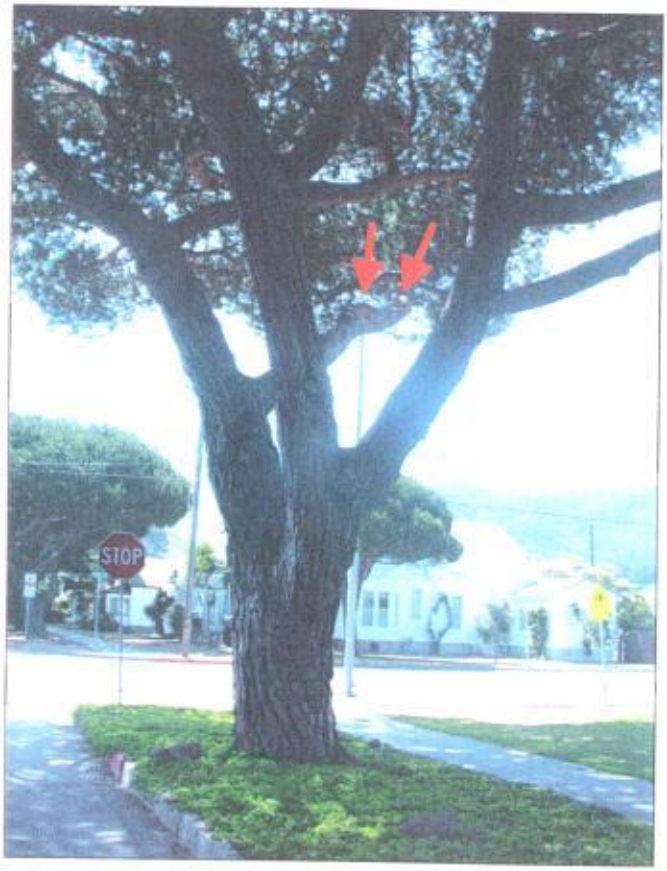
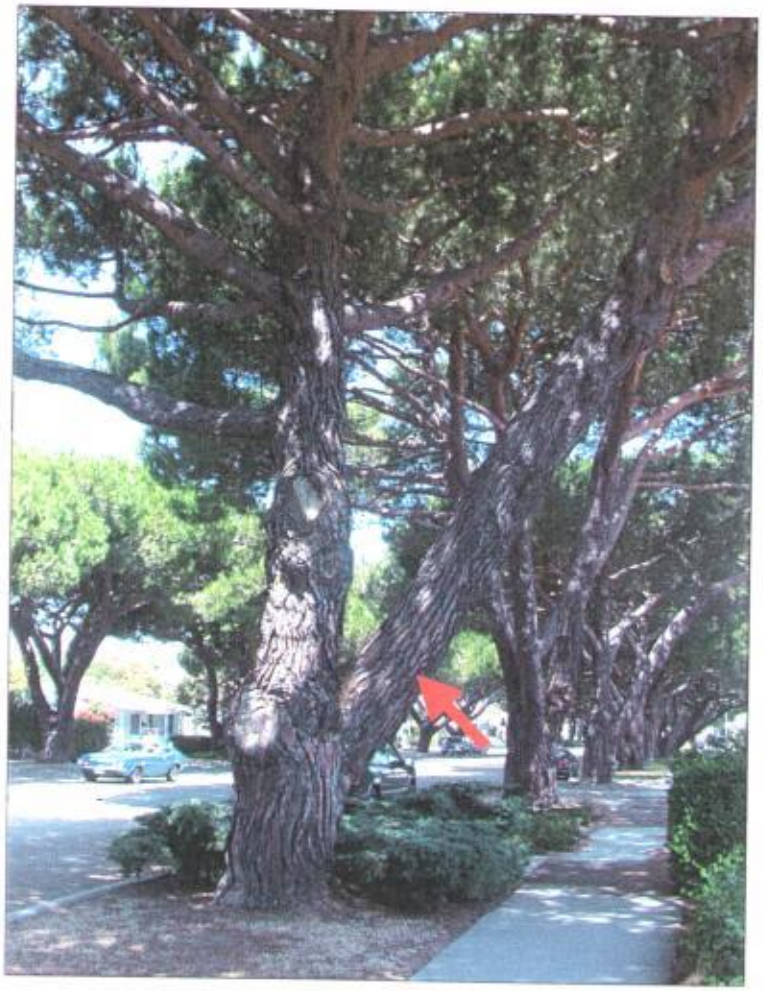


Photo references

Above right: the tree located at 434 H Street and several in a row beyond, looking north. The long limb (red arrow) appears menacing as it rises toward the adjacent residence. Long limbs such as this can become destabilized when weight increases due to end weight and their cantilever away from the point of attachment.



Below right: the tree located at 436 H Street (south tree). This younger tree is somewhat unstable – pruning treatments to mitigate potential wind-throw are warranted.

Assessment of H Street Italian Stone Pines - City of Lompoc California

Summer, 2003

Tree Address (n=north s=south)	Tree (GIS) Location Number	Trunk Diameter (dbh or narrowest)	# of Major Scaffold Limbs	Large Trunk Wounds	Substantial Included Bark	Pocket Formation @ Bifurcation	Resistograph Measurement	Significant Trunk Lean	Long Horizontal Limbs	Crown Excessively Thin	Condition Comments
200n	10629	46.5	2	yes	yes	no	no	no	no	yes	twisted kinking limbs; galls
200s	8225	48.5	2	yes	yes	no	no	yes	west	no	lateral limbs appear pinched; end weight concern
201n	10628	45	1	yes	no	no	no	no	south	no	end weight concern over street
201s	8226	46.5	5	yes	no	small	no	no	west	no	end weight concern over private property
210	8224	52.5	3	yes	no	yes	2xs	no	no	no	lopsided canopy; some decay at pocket
211	8209	50	3	yes	no	no	no	no	no	no	curb taken out, some cut roots
214	8223	47	4	yes	yes	yes	yes	southeast	no	no	very moist soil, soil cracks, hollow soil; some decay at pocket
215n	8210	43.3	2	yes	yes	no	no	no	southeast	no	end weight concern over street
215s	8211	40.5	2	yes	yes	no	no	southeast	no	no	no comment
220	8222	40.5	2	no	yes	no	no	no	yes	no	moist to north, twisted trunk, hollow soil
222	8221	48	3	yes	no	no	no	no	no	no	no comment
223	8212	55	3	yes	no	small	no	south	south	no	some evidence of old root/soil failure
224	8220	46.5	4	no	no	no	yes	southeast	yes	no	missign buttress roots, 2 major scaffold limbs over adjacent home
227	8213	46.5	3	yes	yes	no	no	no	west	no	end weight concern over private property
228	8219				yes	yes					fallen tree
231n	8214	52.5	6	yes	yes	yes	2xs	no	north	no	internal crack and decay associated with external pocket
231s	8215	48	3	yes	yes	yes	yes	no	north	no	internal decay associated with external pocket
236	8218	58	5	yes	yes	yes	2xs	east	no	no	internal crack and decay associated with external pocket
237	8216	48.5	3	yes	yes	no	no	no	no	no	no comment
238	8217	44	2	no	no	no	no	no	yes	no	heavy end weight, galls
302	8236	45.5	3	yes	no	no	no	southeast	yes	no	leans over building and street, galls
303	8227	52	5	yes	yes	yes	2xs	south	yes	no	dense, hard wood in interior of trunk; some decay at pocket
306	8235	39.5	3	no	no	no	yes	south	no	no	exemplar measurement for internal wood at vertical trunk bark seam
307	8228	41.5	2	yes	no	no	no	south	no	no	curb repaired; no other comment
310n	8234	49.5	4	yes	yes	yes	3xs	no	no	no	internal decay associated with external pocket
310s	8233	55	4	yes	yes	no	no	east	west	no	some concern for possible root failure
311n	8229	45.5	4	yes	yes	no	no	no	south	no	long horizontal limbs over street
311s	8230	45.5	2	yes	yes	no	no	no	no	no	abuts driveway apron; long vertical trunk seam
319	8231	38	1	no	no	no	no	no	no	yes	recently raised canopy
320	8232	47	3	yes	no	no	yes	east	no	no	several long seams in trunk

Prepared by M.T. Mahoney, registered consulting arborist

Assessment of H Street Italian Stone Pines - City of Lompoc California

Summer, 2003

Tree Address (n=north s=south)	Tree (GIS) Location Number	Trunk Diameter (dbh or narrowest)	# of Major Scaffold Limbs	Large Trunk Wounds	Substantial Included Bark	Pocket Formation @ Bifurcation	Resistograph Measurement	Significant Trunk Lean	Long Horizontal Limbs	Crown Excessively Thin	Condition Comments
322	8246	52	5	yes	yes	yes	no	no	no	no	too thick for Resistograph measurement; oak seedling in pocket
323n	8237	34.5	2	yes	no	no	no	no	yes	no	concern for end weight of horizontal limbs
323s	8238	40.5	3	yes	no	no	no	no	yes	no	long horizontal limbs over house - resident concerned
326n	8245	55	5	yes	yes	yes	yes	southeast	no	no	internal crack and decay associated with external pocket
326s	8244	43.5	5	no	yes	no	no	no	no	no	several scaffold limbs have grafted together
330	8243	52	4	yes	yes	no	no	southeast	no	no	scaffold limbs seem pinched
331n	8239	41.5	4	yes	yes	no	no	no	no	no	sidewalk displaced by roots on west side of tree
331s	8240	42.5	3	yes	yes	no	yes	no	no	no	possible pocket considered - Resistograph measurement = negative
335	8241	42	2	yes	no	no	no	no	yes	no	reduce limb end weight
105*	8242	45	4	yes	yes	no	no	south	yes	no	*on corner of Olive; some concern for possible root failure
400	7926	39.5	2	yes	yes	no	no	east	yes	no	cabled; overhangs house; soil uplifted but firm; open cavity
403n	7907	37	2	no	no	no	no	south	yes	no	concern for end weight of horizontal limbs
403s	7908	46.5	5	yes	yes	no	no	no	yes	no	concern for end weight of horizontal limbs
404	7925	47.5	4	yes	yes	no	no	no	no	no	vertical bark seams extend down trunk into the ground
408	7924	44.5	2	yes	no	no	no	no	yes	no	concern for end weight of horizontal limbs
411n	7909	42	5	no	yes	no	no	south	yes	no	concern for end weight of horizontal limbs
411s	7910	40	3	no	yes	no	no	souht	no	no	driveway to south is very close
412	7923	43	2	yes	no	no	no	no	south	no	twisted limbs; galls; end weight concern
415	7911	46	3	no	no	no	no	no	yes	no	large galls on trunk at several elevations; end weight concern
420	7922	47	3	yes	no	no	no	no	no	no	cavity with brown rot; cables (too low); strong woundwood ribs
423n	7912	45.5	4	yes	yes	no	no	no	yes	no	galls at major scaffold limb bifurcation; end weight concern
423s	7913	46.5	4	yes	no	no	no	no	yes	no	galls at major scaffold limb bifurcation; end weight concern
426	7921	41	3	yes	yes	no	no	no	yes	no	recent loss of large limb; concern for end weight
429	7914	41.5	2	yes	yes	no	no	no	no	yes	dead lawn in vicinity
430	7920	51	5	no	no	yes	yes	no	no	yes	poison oak growing in pocket
434	7919	40.5	2	yes	yes	no	no	no	east	no	long horizontal limb over house; looks dangerous
435	7915	49	2	yes	no	no	no	south	no	yes	canopy thinning on south side
436n	7918	40	2	yes	yes	no	no	east	yes	no	looks dangerous; threatens private property
436s	7917	26.5	2	no	yes	no	no	southeast	yes	no	concern for root/soil stability; threatens private property
439	7916	43.5	2	yes	no	no	no	no	southeast	no	visqueen and rock-covered parkway; end weight concern

Prepared by M.T. Mahoney, registered consulting arborist