



June 19, 2008

Job No. 08-105

Mr. Robert Peterson  
Director  
Napa County Public Works Department  
1195 Third Street, Room 201  
Napa, California 94559

Re: Road Exception Request for Tucker Road, NCAPN 020-262-015, P07-00792 & P07-00793

Dear Mr. Peterson:

Our client, Mr. Brian Burke, submitted a use permit exception and variance application in November of 2007 requesting approval to construct a modest size home on his property located at the intersection of Summit Drive and Tucker Road in Calistoga, California, also known as Napa County Assessor Parcel Number (NCAPN) 020-262-015. The parcel is zoned Agricultural Watershed (AW), which is consistent with the intention to construct a single family residence on site. The entire parcel is enveloped in a stream setback and is characterized by steep slopes. The use permit exception is necessary to grade on average slopes over 30 percent, but less than 50 percent, and to grade within the stream setback established by the conservation regulations. The variance request is necessary as the ideal building location, which will minimize grading and encroachment into the stream setback, is located within the front yard setback established by the zoning regulations. The parcel is currently undeveloped. The site is accessed by private roads established when the Tucker Acres subdivision was originally created.

Tucker Road from the end of the County maintained portion to the fork at Summit Drive currently conforms to Napa County standards for a residential driveway. Please see the enclosed photograph exhibit documenting the existing conditions of this portion of Tucker Road. However, the portion of Tucker Road from the fork with Summit Drive to the project site, past the project site and reconnecting with Summit Drive is an unimproved dirt road currently utilized by an existing residence. Please refer to the enclosed exhibit titled "Tucker Road Conceptual Driveway Design" dated June 19, 2008 for details.

The project assumes that the site will primarily be accessed from the southern portion of Tucker Road at the connection with Summit Drive (Station 19+30 on Sheet C2). However, due to the extreme slopes surrounding the proposed building site, a hammerhead turnaround in conformance with Napa County Fire code cannot be achieved within 50' of the proposed building site. To determine the best solution for fire access, I met with Gabrielle Avina, Napa County Fire Marshall, at the site. Gabrielle has requested that to mitigate the absence of a hammerhead near the building site, Tucker Road from the project site to the reconnection with Summit Drive at Station 10+25 and heading north down to the northern paved portion of Tucker Road be improved to Napa County residential standards at the time of building permit.

Due to the presence of large mature oak trees and extreme slopes immediately west of the building site along the existing dirt road to Summit Drive (Station 10+25 to 12+00), a portion of the requested improvements will require a road exception to implement. However, we believe that the portion of Tucker Road from the western connection with Summit Drive, heading north from station 10+25 down the existing dirt road to the improved portion of Tucker Road can be accomplished without the need for a road exception and therefore is not included with this request. Furthermore, due to steep side slopes, established drainage courses and the presence of large mature trees, the centerline radius between Station 15+25 and 15+50 cannot meet the requirements of Napa County Code and therefore an exception will be requested.

The subject exception request applies to the portion of Tucker Road located between Station 10+25 to 12+00 and 15+25 to 15+50. Following is a description of the existing and proposed conditions along this portion of Tucker Road to the fork with Summit Drive:

|                         |  |
|-------------------------|--|
| Station 10+25:          | Install new connection with Summit Drive   |
| Station 10+25 to 11+50: | Improve existing 8.5'± dirt road to 10' wide with a rough concrete surface. A road exception is requested for reduced width.   |
| Station 10+75 to 11+75: | Road exception requested to increase centerline slope to a maximum of 25% slope. Please see enclosed calculations for details.   |
| Station 11+50 to 12+25: | Install new asphalt driveway connection to proposed residence which will also serve as a turnout.  |
| Station 12+25 to 19+30: | Improve existing 8'± dirt road to full County standard width with asphalt concrete surface or equivalent.  |
| Station 14+00:          | Existing driveway to serve as turnout.   |
| Station 15+25 to 15+50: | Road exception requested to reduce centerline radius to 30'. Total width of travel way shall be improved to 12' wide with asphalt concrete surface or equivalent and the outside shoulder shall be increased from 2' to 3' wide with Class 2 aggregate base surface to allow for a wider turning path. |

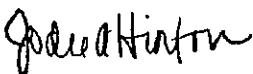
Station 16+25: Install new County standard turnout with Class 2 aggregate base surface.

To achieve the same overall practical effect as the County standards in the section where a reduced width is requested, the existing dirt road will be widened to the fullest extent practical. Additionally, in the portion where an increase in allowable centerline slope is requested, a rough concrete surface will be utilized to provide the same overall practical effect as the County Standard. Furthermore, horizontal and vertical vegetation management will be implemented along the entire road to provide an unobstructed width of 14' with 10' on each side of the roadway cleared and a vertical clearance of no less than 15'. To mitigate the absence of a hammerhead turnaround within 50' of the building, the building will be constructed with ignition resistant construction per the requirements of Chapter 7A of the California Building Code and a residential sprinkler system in conformance with NFPA 13D will be installed. Finally, to mitigate the reduced centerline radius between station 15+25 and 15+50, the travel way and shoulder shall be increased to provide a total width of 17' to allow for a wider turning path.

In summary, an exception to the County standards for width is requested for 125 feet of the unimproved 930 foot long driveway. Thus, 87% of the road will be constructed to the full County standards for width. Additionally, an exception is requested to increase the centerline slope to a maximum of 25% slope for 100 feet of the driveway and to reduce the centerline radius in a 50' section. Finally, the project is requesting an exception for installation of a hammerhead turnaround within 50' of the building. The requested exception to the County standards is necessary to preserve the natural environment and to avoid grading on steep slopes and removal of large mature trees.

We look forward to hearing from a representative from your department to schedule a site visit. Please contact our office if you have any questions.

Sincerely,



Jodee A. Hinton, P.E.  
Principal

Enclosures:

Photograph Documentation Exhibit of Tucker Road  
Centerline Slope Supporting Calculations  
Tucker Road Conceptual Driveway Design - (1) 24"x36" and (1) 11"x17"

Copy: Brian Burke

**TUCKER ROAD**  
**CENTERLINE SLOPE EXCEPTION REQUEST**  
**SUPPORTING CALCULATIONS**

PREPARED BY:  
Applied Civil Engineering Incorporated  
2074 West Lincoln Avenue  
Napa, California 94558  
Telephone: (707) 320-4992

**ASSUMPTIONS:**

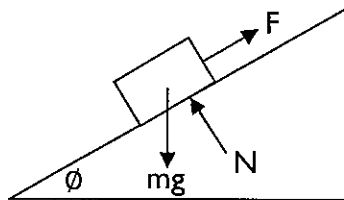
**1. Friction Factor for Wet Concrete = 0.60**

Source: Engineer's Handbook, Reference Tables – Coefficient of Friction  
Rubber on Concrete Wet: 0.45 – 0.75, use 0.60 for average  
<http://www.engineershandbook.com/Tables/frictioncoefficients.htm>

**2. Average Vehicle Weight (2 axles) = 3,000 lbs**

**Force on drive wheels = 3,000 lbs/2 axles = 1,500 lbs**

**FIGURE:**



**EQUATIONS:**

$$N = \frac{mg}{g_c}$$
 Civil Engineering Reference Manual, Equation 73.19b

Where:

$N$  = Normal Force

$m$  = mass

$g$  = gravity

$g_c$  = gravitational constant

$$F = fN$$
 Civil Engineering Reference Manual, Equation 73.21

Where:

$F$  = Frictional Force

$f$  = friction factor

$\tan \phi = f$  Civil Engineering Reference Manual, Equation 73.22

Where:

$\phi$  = Frictional Force

$f$  = friction factor

### **CALCULATIONS:**

Friction Force on Drive Wheels:

$$F = fN$$

$$F = (0.60)(1,500 \text{ lbs})$$

$$F = 900 \text{ lbs}$$

Calculate Critical Angle:

$F = fN$ , therefore  $f = F/N$ , where  $N$  is the total weight of the vehicle

$$f = (900 \text{ lbs}) / (3,000 \text{ lbs})$$

$$f = 0.30$$

$$\tan \phi = f$$

$$\phi = \tan^{-1} f$$

$$\phi = \tan^{-1} 0.30$$

$$\phi = 16.7^\circ$$

Calculate Maximum Slope Based on Critical Angle:

$$\text{Slope} = \frac{\text{rise}}{\text{run}} = \tan \phi$$

$$\text{Slope} = \tan (16.7^\circ)$$

$$\text{Slope} = 0.30$$

$$\text{Slope} = 30\%$$

The maximum theoretical slope before a 3,000 lbs vehicle traveling on wet concrete will start to slide is 30%. The proposed centerline slope requested in the exception is 24.7%, thus the requested centerline slope is feasible for vehicular access.