**TRAFFIC SAFETY ADVISORY COMMITTEE MEETING**
**Wednesday, April 5, 2023 at 1:00pm**
**Stow Town Building**
**380 Great Road, Stow, MA 01775**

Town Building and
On-line

Topic: TSAC
Time: April 5, 2023 1:00PM Eastern Time (US and Canada)

Join Zoom Meeting
https://us06web.zoom.us/j/81756295320?pwd=am4zQVZCZXM0NVBUUGxEeGpGVFlQdz09
Meeting ID: 817 5629 5320
Passcode: 364920

| | | |
|---|---|---|
| 1. | 1:00 PM | Call to Order |

***Traffic Safety Advisory Committee Administrative Items***

| | | |
|---|---|---|
| 2. | | Public Input |
| 3. | | Review Minutes |
| 4. | | Member Updates |

***Appointments/Discussion/Action Items***

| | | |
|---|---|---|
| 6. | | Tree Warden Updates and Packard Road Tree at Great Road |
| 7. | | Continued Review of Streets List |
| 8. | | Lake Boon Dam Crossing |
| 9. | | Harvard Road at Garner Road Line Painting |

***Posted March 31, 2023 at 1:00pm***

Town of Stow
Traffic Safety Advisory Committee

Minutes of March 1, 2023, Traffic Safety Advisory Meeting
Members Present: Chief Michael Sallese, Fire Chief John P Benoit, Acting Highway Department Superintendent Brian Hatch, & Valerie Oorthuys
Chief Sallese called meeting to order 1:00 PM

**Approval of Minutes | February 8, 2023**
Chief Benoit moved to approve the minutes with change noted for February 8, 2023. Valerie Seconded.
VOTED: 4-0 (Unanimously in favor: Chief Benoit- Yea; Brian Hatch – Yea; Chief Sallese –Yea; Valerie Oorthuys-Yea)

**Member Updates:**
-Curve signs for Taylor Road arrived on Monday after unexpectedly needing to be ordered. To be installed in the coming weeks.
-Maura Drive Sign: Different sign to be ordered to indicate that it will be a curve with a side road off of it. Updated sign to be installed after it arrives.
-Chief Benoit: Johnston Way telephone poles. Main pole to be on 117 side near rock pilar and the other pole will be slanted near it. Fire Department to test getting around it with a ladder truck while it is there temporarily. Select Board approved installation.

**Batteries for Radar Signs**:
-Brian Hatch would like to order 4 batteries for approximately $1100 total.
*Chief Sallese motions approval for Hatch to order batteries. Brian Hatch seconds.*
*VOTED: 4-0 (Unanimously in favor: Chief Benoit- Yea; Brian Hatch – Yea; Chief Sallese –Yea; Valerie Oorthuys-Yea)*

**Street Light at Old Marlboro Road:**
-This will be tabled for now until a permanent option for the intersection is established.

**Old Marlboro Road Options:**
-Traffic Counter data shows that there was not much difference between no changes and option 1 but there was a difference between Option 1 and Option 2.
-Due to resident feedback, option 2 was reversed shortly after being put into effect.
-Option 1 to be kept in place until we receive an engineered plan to relook at intersection.
-Stop sign to be kept in place.
-After the snow (hopefully in a couple weeks), traffic counter to be put on Barton Road.

**Letter to Tree Warden:**
-This will be discussed at the next TSAC Meeting.

**Lake Boon Crossing:**
-Traffic Engineers to look into traffic calming options and follow up with Chief Sallese.

**Drive Thru Proposal:**
-Chief Sallese proposes a letter to the Planning Board and Select Board from TSAC that they will work with businesses.
-Chief Sallese to come up with tentative letter for TSAC Approval.
*Zoom only meeting to review drive thru letter: March 7th at 1pm.*

**Review of Streets List:**
-Street List Review is ongoing and more information will be collected for discussion at the next meeting.

**FAQs:**
-Add roadways discussed by way of a link.

**Next Meeting April 5, 2023 at 1 PM**
Motion to adjourn at 1:58PM: Chief Benoit. Chief Sallese Seconds.
*VOTED: 4-0 (Unanimously in favor: Chief Benoit- Yea; Brian Hatch – Yea; Chief Sallese –Yea; Valerie Oorthuys-Yea)*

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## Chief Michael Sallese

**From:** Brian Hatch
**Sent:** Tuesday, March 7, 2023 9:57 AM
**To:** Chief Michael Sallese; JP Benoit; Valerie Oorthuys; Phoenix Dwyer
**Subject:** FW: tree

Good Morning

Here is a letter that Bruce Fletcher responded to Steve about the same tree at Packard and it obviously came up at a previous meeting that Steve seem to not pass along

Brian Hatch
Superintendent ( Interim )
Stow Highway Department
88 South Acton Road
Stow, MA 01775
(978) 897-8071

**From:** bruceefletcher@verizon.net <bruceefletcher@verizon.net>
**Sent:** Sunday, March 05, 2023 8:59 PM
**To:** Brian Hatch <highway2@stow-ma.gov>
**Subject:** Re: tree

Hi Brian,

I see this as a perfect example of a perceived hazard, rather than a real one. Which is the case with most complaints. That tree has been there a long time, and I don't believe it has caused any real problems.

Also, I don't think it's dead. I looked at it again after I got your message. It appears to be full of buds, but we'll know for sure in the spring. It's true that it does have a couple bad limbs, though.

Below is the email response I sent to Steve when he asked me to look at it.

I'll revisit the tree in the spring.

Bruce

**From:** bruceefletcher@verizon.net <bruceefletcher@verizon.net>
**Sent:** Monday, November 1, 2021 6:37 PM
**To:** Steve Nadeau <highway@stow-ma.gov>
**Subject:** 28" Sugar Maple, Great Rd at Packard Rd

Hi Steve,

At your request I visited the intersection of Great Rd and Packard Rd at a couple times to see if the maple tree that's been there since my grandfather was born has suddenly become an issue due to its

location. The tree appears to be in the same location it has always been, and I did not notice anything else about it that has changed recently. However, it may be getting slightly bigger each year. While I was stopped at the stop bar, I had a very good view of all the traffic headed westbound, approaching Packard Rd from the east, as has always been the case. After ensuring that there was no foot or bicycle traffic on the Byway or in the crosswalk, I pulled ahead to the sideline of Great Rd where I stopped again, and I had excellent visibility of all traffic from that point, as well.

The tree in question is in surprisingly good condition considering its age and location. It appears quite healthy, with no decay evident on the exterior, at least from a cursory inspection from my vantage point the ground, and there are no mushrooms or other fungi that would be indicative of hidden decay under the bark. The crown also looks healthy.

My conclusion is that I see no reason for the tree to be declared a hazard, and therefore I see no reason to take action to have it removed at this point in time. However, because of the expressed concern, I will monitor the ongoing condition of the tree more closely than I otherwise would. The condition of a tree can change fairly quickly for many reasons, as you know. I will let you know if I notice anything of concern.

Municipally yours,

Bruce

*Bruce E. Fletcher*
*Tree Warden*
*978-430-6359*

— —

On Friday, March 3, 2023 at 08:12:23 AM EST, Brian Hatch <highway2@stow-ma.gov> wrote:

Good Morning Bruce

We ( Traffic Safety Committee ) have a tree that was brought to our attention regarding a visibility issue and possibly dead that you may want to have removed. I also believe it falls under the Public Shade Tree statutes , so can you look at the tree and if you can send me a response letter regarding your opinion to the health, visibility, and if we could take down tree in your opinion.

The tree in question is located at the corner of 117@Packard Rd. heading West on the East side of Packard Rd.

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**From:** Chief Michael Sallese
**Sent:** Thursday, March 30, 2023 7:49 AM
**To:** Phoenix Dwyer
**Subject:** FW: Form submission from: Traffic Safety Advisory Committee Request Submittal Form

Last agenda item

*Michael Sallese, Chief of Police*
*Stow Police Department*
*305 Great Road*
*Stow, MA 01775*
*Direct Line 978-897-0049*
*Station 978-897-4545*

**From:** Stow MA via Stow MA <cmsmailer@civicplus.com>
**Sent:** Wednesday, March 29, 2023 6:03 PM
**To:** stowpolice <stowpolice@stow-ma.gov>
**Subject:** Form submission from: Traffic Safety Advisory Committee Request Submittal Form

Submitted on Wednesday, March 29, 2023 - 6:03pm
Submitted by anonymous user: 68.163.102.49
Submitted values are:

First Name: Richard
Last Name: Rollins
Street Address: 18 CARRIAGE LANE
Address Line 2:
City, State, Zip (if other than Stow):
E-Mail Address: rrollins@yahoo.com
Please describe the location of the traffic concern: corner of 117 (Great Road) and Packard Rd.
Please describe the nature of the neighborhood traffic problem you are concerned with : There is an old tree blocking the traffic sight line causing a safety hazard. The tree doesn't appear to be on private property but is almost on the road. Drivers exiting Packard Road and turning left to head East on 117 are in danger of not seeing oncoming traffic resulting in a collision. I am requesting that the town remove the tree.
Please list possible solutions to the problem that you would like the Town of Stow to consider: Take down the tree that is causing the traffic safety hazard.
Please attach any documents you would like the Committee to review here: https://www.stow-ma.gov/system/files/webform/img_4677.jpg

**Public Ways on Town of Stow List but not on Mass DOT Chapter 90 List:**
Cardinal Court
Cricket Court
Fox Court
Lane's End
Robinwood Lane
Salamander Lane
Wildlife Way
Woodpecker Court

**Roads on Mass DOT Chapter 90 List but not on Town of Stow Lists:**
Heights Terrace
Melones Road
Wilkins Street

# Town of Stow
## OFFICE OF THE TOWN CLERK
**Town Building - 380 Great Road**
**Stow, Massachusetts 01775-2127**
(978) 897-4514 x 1
FAX (978) 897-4534


TO WHOM IT MAY CONCERN:

The following named streets and roads located in the Town of Stow are **PUBLIC WAYS** to which the public has free right of access, and are laid out according to statute. As Records Custodian, this is a true copy of the records under my care.

Adams Drive
Apple Blossom Lane
Barton Road for a distance of 1500 ft.
from Sudbury Road
Birch Hill Road
Blueberry Court
Boon Road
Box Mill Road
Boxboro Road
Bradley Lane
Brook Mill Road
Brookside Avenue
Cardinal Court
Carriage Lane
Catherine Circle
Chestnut Street
Cider Mill Road
Circuit Drive
Common Road
Conant Drive
Cranberry Circle
Crescent Street
Cricket Court
Cross Street
Delaney Street
DeVincent Drive
Dunster Drive
Edgehill Road
Edson Street
Eliot Drive
Elm Ridge Road
Evelyn Road
Fairway Drive
Farm Road
Forest Road
Fox Court
Foxglove Lane
Frances Circle
Gardner Street
Garner Road
Gates Lane
Gleasondale Road (Route 62)
Great Road (Route 117)
Hartley Road for a distance of 400 ft.
northerly of Crescent Street
Harvard Road
Hastings Street
Heritage Lane
Hickory Lane
High Street
Hiley Brook Road
Hillcrest Avenue
Hudson Road
Indian Ridge Road
Kerrington Way
Kettell Plain Road
Kirkland Drive
Ladyslipper Lane

Lane's End
Lantern Lane
Library Hill Road
Lowell Drive
Maguire Lane
Maple Street
Marlboro Road
Maura Drive
Middlemost Way
Militia Circle
Ministers Way
No Name Road
Nyra Road
October Lane
Old Bolton Road
Packard Road
Partridge Lane
Peabody Drive
Pine Ridge Road
Pompositticut Street
Railroad Avenue
Randall Road
Red Acre Road
Robert Road
Robinwood Lane
Salamander Lane
Sandy Brook Drive
Sawmill Road for a distance of 775 ft. from Circuit Drive
South Acton Road
State Road
Sudbury Road
Taylor Road
Timberedge Road
Treaty Elm Lane
Trefry Lane
Tuttle Lane
Walcott Street
Wedgewood Road
West Acton Road
Wetherbee Lane
Wheeler Road
Whelden Lane
Whispering Way
White Pond Road
Whitman Street
Whitney Road
Wildlife Way
Woodland Way
Woodpecker Court

Total of 106 public ways

Linda E. Hathaway, Town Clerk

June 2010

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# Town of Stow
## OFFICE OF THE TOWN CLERK

**Town Building - 380 Great Road**
**Stow, Massachusetts 01775-2127**
(978) 897-4514 x 1
FAX (978) 897-4534

TO WHOM IT MAY CONCERN:

The following named streets and roads located in the Town of Stow are **PRIVATE WAYS** to which the public has right of access. As Records Custodian, this is a true copy of the records under my care.

Apple Blossom Way
Asa Whitcomb Way
Assabet Street
Athens Street
Barton Road from termination of public way to Hudson town line
Baum Drive
Billadell Road
Bramble Path
Brandymead Circle ATM 5/19/04 not met
Bruen Road
Canterbury Road
Center Place
Davis Road
Dawes Road
Deacon Benham Drive
Deer Field Lane
Dunster Drive (Derby Woods portion)
Elaine Avenue
Elizabeth Drive
Fieldstone Drive
Goshen Lane
Hale Road
Hallocks Point Road
Heath Hen Trail
Heights Street
Homestead Lane
Johnston Way
Kingland Road
Lakewood Road
Laws Lane
Marcia Drive
Martin Lane
Middlemost Way from end of public way to Circuit Drive
Mitchell Road
North Shore Drive
O'Connell Way
Parker Road
Pilot Way for a distance of 70' from Boxboro Rd.
Pine Point Road
Queens Lane
Rice Point Road
Riverview Avenue
Rockbottom Road
Russet Lane
Samuel Prescott Drive
Sawmill Rd from end of public way to Timberedge Road
Seven Star Lane
Shore Avenue
Stiles Farm Road
Sunset Road
Sylvan Drive
Thicket Circle
Walnut Ridge Road
Wildwood Road
Windmill Hill Road
Woodman Drive

10/10/2017

Zander Way

Linda E. Hathaway
Stow Town Clerk

The following are subdivision streets –
Arbor Glen Drive – Arbor Glenn
Heather Lane

Baldwin Drive – Villages of Stow
Cortland Drive
Golden Drive
Harvest Drive
McIntosh Drive
Orchard Drive

Note:
The following are driveways given road names:

Faxon Drive
Grove Hill Road
Meeting House Lane
Warren Road

| Street Name | City/Town Accepted | MassDOT | Unaccepted | Other | Total Miles |
|---|---|---|---|---|---|
| ADAMS DRIVE | 0.62 | 0 | 0 | 0 | 0.62 |
| APPLE BLOSSOM LANE | 0.268 | 0 | 0 | 0 | 0.268 |
| ASSABET STREET | 0 | 0 | 0.072 | 0 | 0.072 |
| BARTON ROAD | 0.286 | 0 | 0.792 | 0 | 1.078 |
| BILLADELL ROAD | 0 | 0 | 0.106 | 0 | 0.106 |
| BIRCH HILL ROAD | 0.617 | 0 | 0 | 0 | 0.617 |
| BLUEBERRY COURT | 0.049 | 0 | 0 | 0 | 0.049 |
| BOON ROAD | 0.725 | 0 | 0 | 0 | 0.725 |
| BOX MILL ROAD | 0.287 | 0 | 0 | 0 | 0.287 |
| BOXBORO ROAD | 1.839 | 0 | 0 | 0 | 1.839 |
| BRADLEY LANE | 0.366 | 0 | 0 | 0 | 0.366 |
| BROOK MILL ROAD | 0.171 | 0 | 0 | 0 | 0.171 |
| BROOKSIDE AVENUE | 0.221 | 0 | 0 | 0 | 0.221 |
| CANTERBURY ROAD | 0 | 0 | 0.087 | 0 | 0.087 |
| CARRIAGE LANE | 0.201 | 0 | 0 | 0 | 0.201 |
| CATHERINE CIRCLE | 0.147 | 0 | 0 | 0 | 0.147 |
| CENTER PLACE | 0 | 0 | 0.101 | 0 | 0.101 |
| CHESTNUT STREET | 0.124 | 0 | 0 | 0 | 0.124 |
| CIDER MILL ROAD | 0.138 | 0 | 0 | 0 | 0.138 |
| CIRCUIT DRIVE | 0.421 | 0 | 0 | 0 | 0.421 |
| COMMON ROAD | 0.113 | 0 | 0 | 0 | 0.113 |
| CONANT DRIVE | 0.336 | 0 | 0 | 0 | 0.336 |
| CRANBERRY CIRCLE | 0.171 | 0 | 0 | 0 | 0.171 |
| CRESCENT STREET | 0.934 | 0 | 0 | 0 | 0.934 |
| CROSS STREET | 0.198 | 0 | 0 | 0 | 0.198 |
| DAVIS ROAD | 0 | 0 | 0.252 | 0 | 0.252 |
| DAWES ROAD | 0 | 0 | 0.041 | 0 | 0.041 |
| DELANEY STREET | 0.6 | 0 | 0 | 0 | 0.6 |
| DEVINCENT DRIVE | 0.225 | 0 | 0 | 0 | 0.225 |
| DUNSTER DRIVE | 0 | 0 | 0.69 | 0 | 0.69 |
| EDGEHILL ROAD | 0.446 | 0 | 0 | 0 | 0.446 |
| EDSON STREET | 0.414 | 0 | 0 | 0 | 0.414 |
| ELAINE AVENUE | 0 | 0 | 0.095 | 0 | 0.095 |
| ELIOT DRIVE | 0.278 | 0 | 0 | 0 | 0.278 |
| ELIZABETH DRIVE | 0 | 0 | 0.069 | 0 | 0.069 |
| ELM RIDGE ROAD | 0.347 | 0 | 0.079 | 0 | 0.426 |
| EVELYN ROAD | 0.273 | 0 | 0 | 0 | 0.273 |
| FAIRWAY DRIVE | 0.192 | 0 | 0 | 0 | 0.192 |
| FARM ROAD | 0.55 | 0 | 0 | 0 | 0.55 |
| FOREST ROAD | 0.225 | 0 | 0 | 0 | 0.225 |
| FOXGLOVE LANE | 0.12 | 0 | 0 | 0 | 0.12 |
| FRANCES CIRCLE | 0.177 | 0 | 0 | 0 | 0.177 |
| GARDNER STREET | 0.101 | 0 | 0 | 0 | 0.101 |
| GARNER ROAD | 0.381 | 0 | 0 | 0 | 0.381 |
| GATES LANE | 0.415 | 0 | 0.187 | 0 | 0.602 |
| GLEASONDALE ROAD | 2.965 | 0.038 | 0 | 0 | 3.003 |

| | | | | | |
|---|---|---|---|---|---|
| GREAT ROAD | 4.058 | 0.058 | 0 | 0 | 4.116 |
| HALE ROAD | 0 | 0 | 0.338 | 0 | 0.338 |
| HALLOCKS POINT ROAD | 0 | 0 | 0.181 | 0 | 0.181 |
| HARTLEY ROAD | 0.228 | 0 | 0 | 0 | 0.228 |
| HARVARD ROAD | 2.322 | 0 | 0 | 0 | 2.322 |
| HASTINGS STREET | 0.243 | 0 | 0 | 0 | 0.243 |
| HEIGHTS TERRACE | 0 | 0 | 0.049 | 0 | 0.049 |
| HERITAGE LANE | 0.216 | 0 | 0 | 0 | 0.216 |
| HICKORY LANE | 0.347 | 0 | 0 | 0 | 0.347 |
| HIGH STREET | 0.186 | 0 | 0 | 0 | 0.186 |
| HILEY BROOK ROAD | 0.497 | 0 | 0 | 0 | 0.497 |
| HILLCREST AVENUE | 0.107 | 0 | 0 | 0 | 0.107 |
| HOMESTEAD LANE | 0.299 | 0 | 0 | 0 | 0.299 |
| HUDSON ROAD | 2.152 | 0 | 0 | 0 | 2.152 |
| INDIAN RIDGE ROAD | 0 | 0 | 0.157 | 0 | 0.157 |
| JOHNSTON WAY | 0.187 | 0 | 0 | 0 | 0.187 |
| KERRINGTON WAY | 0.139 | 0 | 0 | 0 | 0.139 |
| KETTELL PLAIN ROAD | 0.472 | 0 | 0 | 0 | 0.472 |
| KINGLAND ROAD | 0 | 0 | 0.756 | 0 | 0.756 |
| KIRKLAND DRIVE | 0.984 | 0 | 0 | 0 | 0.984 |
| LADYSLIPPER LANE | 0.119 | 0 | 0 | 0 | 0.119 |
| LAKEWOOD ROAD | 0 | 0 | 0.256 | 0 | 0.256 |
| LANTERN LANE | 0.374 | 0 | 0 | 0 | 0.374 |
| LAWS LANE | 0 | 0 | 0.177 | 0 | 0.177 |
| LIBRARY HILL ROAD | 0.049 | 0 | 0 | 0 | 0.049 |
| LOWELL DRIVE | 0.577 | 0 | 0 | 0 | 0.577 |
| MAGUIRE LANE | 0.141 | 0 | 0 | 0 | 0.141 |
| MAPLE STREET | 0.97 | 0 | 0 | 0 | 0.97 |
| MARLBORO STREET | 0.383 | 0 | 0 | 0 | 0.383 |
| MAURA DRIVE | 0.145 | 0 | 0 | 0 | 0.145 |
| MELONES ROAD | 0 | 0 | 0.294 | 0 | 0.294 |
| MIDDLEMOST WAY | 0.173 | 0 | 0.144 | 0 | 0.317 |
| MILITIA CIRCLE | 0 | 0 | 0.216 | 0 | 0.216 |
| MINISTERS WAY | 0.142 | 0 | 0 | 0 | 0.142 |
| MITCHELL ROAD | 0 | 0 | 0.204 | 0 | 0.204 |
| NO NAME ROAD | 0.156 | 0 | 0 | 0 | 0.156 |
| NORTH SHORE DRIVE | 0 | 0 | 0.774 | 0 | 0.774 |
| NYRA ROAD | 0.058 | 0 | 0 | 0 | 0.058 |
| OCONNELL WAY | 0 | 0 | 0.073 | 0 | 0.073 |
| OCTOBER LANE | 0.165 | 0 | 0 | 0 | 0.165 |
| OLD BOLTON ROAD | 0.942 | 0 | 0 | 0 | 0.942 |
| PACKARD ROAD | 0.865 | 0 | 0 | 0 | 0.865 |
| PARTRIDGE LANE | 0.201 | 0 | 0 | 0 | 0.201 |
| PEABODY DRIVE | 0.592 | 0 | 0 | 0 | 0.592 |
| PINE POINT ROAD | 0 | 0 | 0.493 | 0 | 0.493 |
| PINE RIDGE ROAD | 0.171 | 0 | 0 | 0 | 0.171 |
| POMPOSITTICUT STREET | 0.375 | 0 | 0 | 0 | 0.375 |

| | | | | | |
|---|---|---|---|---|---|
| QUEENS LANE | 0 | 0 | 0.114 | 0 | 0.114 |
| RAILROAD AVENUE | 0.11 | 0 | 0 | 0 | 0.11 |
| RANDALL ROAD | 1.065 | 0 | 0 | 0 | 1.065 |
| RED ACRE ROAD | 1.667 | 0 | 0 | 0 | 1.667 |
| ROBERT ROAD | 0.496 | 0 | 0 | 0 | 0.496 |
| ROCKBOTTOM ROAD | 0.095 | 0 | 0 | 0 | 0.095 |
| SAMUEL PRESCOTT DRIVE | 0 | 0 | 0.335 | 0 | 0.335 |
| SANDY BROOK DRIVE | 0.308 | 0 | 0 | 0 | 0.308 |
| SAWMILL ROAD | 0.398 | 0 | 0 | 0 | 0.398 |
| SEVEN STAR LANE | 0 | 0 | 0.096 | 0 | 0.096 |
| SHORE AVENUE | 0 | 0 | 0.049 | 0 | 0.049 |
| SOUTH ACTON ROAD | 1.658 | 0 | 0 | 0 | 1.658 |
| STATE ROAD | 0.22 | 0 | 0 | 0 | 0.22 |
| SUDBURY ROAD | 3.377 | 0 | 0 | 0 | 3.377 |
| TAYLOR ROAD | 2.554 | 0 | 0 | 0 | 2.554 |
| TIMBEREDGE ROAD | 0.251 | 0 | 0 | 0 | 0.251 |
| TREATY ELM LANE | 0.273 | 0 | 0 | 0 | 0.273 |
| TREFRY LANE | 0.327 | 0 | 0 | 0 | 0.327 |
| TUTTLE LANE | 0.714 | 0 | 0 | 0 | 0.714 |
| WALCOTT STREET | 0.797 | 0 | 0 | 0 | 0.797 |
| WALNUT RIDGE ROAD | 0 | 0 | 0.202 | 0 | 0.202 |
| WEDGEWOOD ROAD | 0.29 | 0 | 0 | 0 | 0.29 |
| WEST ACTON ROAD | 1.692 | 0 | 0 | 0 | 1.692 |
| WETHERBEE LANE | 0.168 | 0 | 0 | 0 | 0.168 |
| WHEELER ROAD | 0.7 | 0 | 0 | 0 | 0.7 |
| WHELDEN LANE | 0.162 | 0 | 0 | 0 | 0.162 |
| WHISPERING WAY | 0.246 | 0 | 0 | 0 | 0.246 |
| WHITE POND ROAD | 0.782 | 0 | 0 | 0 | 0.782 |
| WHITMAN STREET | 0.872 | 0 | 0 | 0 | 0.872 |
| WHITNEY ROAD | 0.223 | 0 | 0 | 0 | 0.223 |
| WILDWOOD ROAD | 0 | 0 | 0.349 | 0 | 0.349 |
| WILKINS STREET | 0.005 | 0 | 0 | 0 | 0.005 |
| WOODLAND WAY | 0.554 | 0 | 0 | 0 | 0.554 |
| Grand Total Miles | 54.98 | 0.096 | 7.828 | 0 | 62.904 |

**From:** Chief Michael Sallese
**Sent:** Friday, March 17, 2023 12:19 PM
**To:** Phoenix Dwyer
**Subject:** FW: Special Request: Lake Boon Dam crossing

Next traffic safety agenda item

*Michael Sallese, Chief of Police*
*Stow Police Department*
*305 Great Road*
*Stow, MA 01775*
*Direct Line 978-897-0049*
*Station 978-897-4545*

**From:** Spink, Stephen <SpinkS@wseinc.com>
**Sent:** Friday, March 17, 2023 12:06 PM
**To:** Denise Dembkoski <townadministrator@stow-ma.gov>; Chief Michael Sallese <policechief@stow-ma.gov>
**Cc:** Blair, TJ <BlairT@wseinc.com>; Santacruce, Jeffrey <SantacruceJ@wseinc.com>
**Subject:** RE: Special Request: Lake Boon Dam crossing

Hi Denise and Chief Sallese,
As requested, attached is our draft memorandum summarizing the alternatives for guardrails and traffic calming measures along Barton Road at Lake Boon Dam.

In summary, there is a timber guardrail option that we feel would be appropriate for use at the project site provided it is coupled with corresponding timber end terminals as described in the memorandum. We have also selected a couple of traffic calming measures that we feel may be appropriate based on the feedback previously received from the community.

Please let us know if you have any questions and/or edits.

Thank you,
Steve

**Stephen T. Spink, PE**
TEAM LEADER - GEOTECHNICAL ENGINEERING
Office: 978.548.4738
Mobile: 339.440.1467

Weston & Sampson

**Draft For Review**
03/17/2023

Weston & Sampson
55 Walkers Brook Drive, Suite 100, Reading, MA 01867
Tel: 978.532.1900

# MEMORANDUM

**TO:** Ms. Denise Dembkoski, Administrator - Town of Stow

**FROM:** Jefferey Santacruce, PE, PTOE, Weston & Sampson
Stephen Spink, PE, Weston & Sampson

**DATE:** March 17, 2023

**SUBJECT:** Lake Boon Dam
Timber Guardrail Alternatives and Traffic Calming Evaluation

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## INTRODUCTION

Weston & Sampson Engineers, Inc. (Weston & Sampson) is currently providing engineering, design, and permitting services for the rehabilitation of Lake Boon Dam. Our services are being provided in accordance with our agreement with the Town of Stow, dated August 20, 2019.

As requested by the Town of Stow, Weston & Sampson participated in a public meeting on January 31, 2023, to discuss the preliminary design of the Lake Boon Dam rehabilitation project. Among the various topics discussed during the meeting, two items that were requested to be further evaluated included the viability of reinstalling timber guardrails along Barton Road on the crest of the dam and the potential to incorporate traffic calming measures into the project design to reduce vehicular speeds along Barton Road.

Weston & Sampson has prepared this memorandum at the request of the Town to provide additional information regarding the request for timber guardrails and traffic calming measures.

## GUARDRAILS

Existing Conditions

Currently, timber guardrails are located along the edge of Barton Road on both the upstream and downstream sides of the dam. The existing guardrail consists of timber rails connected to timber posts with steel bolted connections, as shown in Figure 1.

Figure 1: Existing timber guardrails along Barton Road.

Design Standards & Requirements

Historically, the National Cooperative Highway Research Program Report 350 (NCHRP 350) entitled *"Recommended Procedures for the Safety Performance Evaluation of Highway Features"* was generally accepted by engineers as the national evaluation standard for determining if a roadside guardrail is suitable from a crash worthiness perspective. However, the typical vehicle size and weight have changed since the publication of NCHRP 350 in 1993, and additional research has been performed in the field of crash testing criteria. In response to these evolving conditions, the American Association of State Highway and Transportation Officials (AASHTO) published the *"Manual for Assessing Safety Hardware (MASH)"* in 2016 as a successor to NCHRP 350.

The Massachusetts Department of Transportation (MassDOT) has adopted MASH crash testing criteria for all roadside guardrail hardware used on projects both on and off the National Highway System (NHS) that have a bid advertisement date of April 18, 2020, or later. MassDOT further recommends the use of W-beam guardrail and guardrail end terminals that conform to the performance requirements contained in the 2016 MASH manual for all projects with the exception of some low-volume local roads (defined as roadways with 4,000 average daily traffic (ADT) or less). Based on data provided through the MassDOT Interactive Road Inventory application, Barton Road has an ADT of approximately 1,154 vehicles per day (VPD), which would be considered a low-volume roadway.

The need for guardrails is based on the volume of daily traffic, the side slopes adjacent to the roadway, and the clear zone. A clear zone is defined as an unobstructed, traversable roadside area that allows a driver to stop safely or regain control of a vehicle that has left the roadway. Guardrail system components include end terminals that anchor the guardrail and are intended to safely redirect vehicles following impact. Crash worthy end terminals are those terminals that meet the current crash test criteria.

Community Feedback

Generally, comments received at the public meeting indicated that timber guardrails are preferred by the majority of residents to preserve the historical culture and appearance of the area. A copy of the 2015 document titled *"Aesthetic Barriers,"* prepared by the U.S. Federal Highway Administration (FHWA), was provided after the meeting by members of the community as possible guardrail options for consideration by the design team and the Town of Stow.

Review of Guardrail Alternatives

As requested, the design team has completed additional investigation into the guardrail alternatives presented in the FHWA document, as well as other commercially available timber guardrails. Refer to the attachments for additional information and the table below for a summary of the products considered.

For reference, the test level (TL) requirement is a function of the posted speed limit of the roadway. TL-2 is to be utilized for a roadway with a posted speed of 45 mph or less, and TL-3 can be used on roadways with a posted speed of 65 mph or less. Since no posted speed limits could be determined for Barton

Road (from either physical signs or online roadway inventory data), it was assumed to have a posted speed of less than 45 mph, which would indicate the need for a guardrail system that meets TL-2 requirements. Therefore, for this project, it would be possible to utilize a guardrail system that meets NCHRP 350 criteria based on the ADT and posted speed limit.

| | TABLE 1: SUMMARY OF TIMBER GUARDRAIL PRODUCTS | | | | |
|---|---|---|---|---|---|
| | PRODUCT | MANUFACTURER | TEST LEVEL | RAIL HEIGHT | END TERMINALS |
| 1. | Ironwood Aesthetic Barrier | West - East Partners, LLC | NCHRP 350 TL-3 | 2'-2" | No crashworthy end terminal is currently available. Acceptable end treatments include anchoring in a backslope or flaring the barrier to the edge of the clear zone. |
| 2. | TimBarrier Street Guard Plus | S.I. Storey Lumber Co. | NCHRP 350 TL-2 | 2'-5" | No crashworthy end terminal is currently available. Acceptable end treatments include anchoring in a backslope or flaring the barrier to the edge of the clear zone. |
| 3. | Steel-Backed Timber Guardrail and Tangent End Terminal | American Timber and Steel | NCHRP 350 TL-2 | 2'-3" | Crashworthy end terminal is currently available. |
| 4. | Steel-Backed Timber Rail | Highway Safety Corp (Connecticut DOT) | NCHRP 350 TL-3 | 2' -6" | No crashworthy end terminal is currently available. |

Conclusions and Recommendations

Based on our review, there appear to be no commercially available aesthetic (timber) barriers that meet the current MASH standards. However, several guardrail options do meet the older NCHRP 350 TL-2 standards and have been utilized for local and collector roads and many work zones with speed levels of 45 mph or less. However, many of these options do not provide crashworthy end terminals, which are also required for use on roadways.

Of the options considered as part of this review, only the steel-backed timber guardrail manufactured by American Timber and Steel (No. 3 in the above table) has an overall structure and crashworthy end terminals that meet the NCHRP 350 Test Level 2 criteria. It is our opinion that the crashworthy end treatments are of critical importance on this project. Without end treatments, the guardrails must either be angled to a point outside the clear zone (approximately 16 feet off the edge of roadway pavement) so that the chance of being struck by

Figure 2: Example of steel-backed timber guardrails.

an errant vehicle is reduced, or the guardrail is buried into a backslope (i.e., not angled down into the ground as many older systems were allowed to do). At the Lake Boon Dam site, extending the guardrails a length of 16 feet off the edge of pavement will result in the guardrail extending outside the Town right-of-way (ROW) onto private property. Burying the guardrails into a backslope at the site is not considered a viable option for this project due to the roadway configuration on top of the dam.

While the first option is to install a guardrail that meets MASH requirements, from a design and safety perspective, in our opinion, a timber guardrail that meets NCHRP 350 standards for both the guardrail and end terminal sections would be considered an acceptable installation for this project given the relatively low volume and low speed nature of the subject roadway. Therefore, if the Town of Stow would prefer to install a new timber guardrail in-lieu of a steel W-beam guardrail, Weston & Sampson recommends that the steel-backed timber guardrail with tangent end terminal sections manufactured by American Timber and Steel be selected.

## TRAFFIC CALMING MEASURE ALTERNATIVES

Barton Road currently consists of an approximately 16-foot-wide roadway with one travel lane in each direction and a sweeping horizontal curve across the dam. As discussed during the public meeting, a slight realignment of Barton Road at the dam crossing is currently planned as part of the rehabilitation project. The realignment will reduce the total curvature and may potentially result in a total roadway widening of approximately 2 feet within the project limits.

Community feedback received during and after the meeting indicated a concern regarding the potential for unintended increases in vehicle speeds at the dam crossing, and an interest in evaluating potential traffic calming measures.

Traffic calming measures are deliberate steps taken to slow down the speed of vehicles in a roadway and improve the safety of motorists, pedestrians, and cyclists. At the Town's request, Weston & Sampson reviewed several alternatives for active calming measures that could be implemented as part of this project. A list of the alternatives and a summary table of considerations specific to each alternative is provided below.

Rumble Strips: Rumble strips are grooves or rows of indents in the pavement designed to alert inattentive drivers through noise and vibration and help to reduce the number of crashes. There are generally two categories of rumble strips. *Longitudinal* (parallel) rumble strips are used to delineate the edge of a road where driver fatigue or inattentiveness is known to cause run-off-the-road crashes. *Transverse* rumble strips are installed perpendicular to the roadway and are used to alert drivers of a need to slow down, stop, or other upcoming changes that may not be anticipated. Transverse rumble strips are placed in the travel lane perpendicular to the direction of travel.

Speed Humps: Not to be confused with speed bumps, speed humps are relatively long, raised speed tables with a flat section in the middle and sloping ramps on the ends. They can be permanent (asphalt) or temporary (rubber/plastic) depending on the material used. Typically, they are located at crosswalks and would require pavement signs and pavement markings in the roadway to alert drivers and bicyclists.

Warning or Regulatory Signs: A warning or regulatory sign is a sign near a road giving information or instructions to drivers. Currently, there appears to be a lack of posted speed limit or warning signs on Barton Road near the dam crossing which could be a contributing factor to perceived speeding. Therefore, consideration should be given to adding posted speed limits signs. In addition, consideration could be given to providing a warning sign alerting drivers to share the road with bicycles and pedestrians or "curve ahead" signs with advisory speed plaques to warn drivers of the curve in the roadway near the dam. Another possible alternative solution is to add warning signs with an advisory speed plaque.

**TABLE 2: SUMMARY OF TRAFFIC CALMING OPTIONS**

| OPTION | ADVANTAGES | DISADVANTAGES |
|---|---|---|
| Longitudinal Rumble Strips | ▪ Shoulder edge and centerline rumble strips have been shown to be particularly effective in reducing the run-off-the-road crashes that are likely to be associated with fatigue or driver inattentiveness.<br>▪ Potential for reduced maintenance of gravel shoulder outside the edge of pavement because more vehicles remain on the roadway.<br>▪ Cost effective. | ▪ Do not tend to reduce speed.<br>▪ Tend not to be employed on narrow roadways because drivers tend to try to avoid them by traveling over the center line and into the adjacent travel lane.<br>▪ One of the intents of the rumble noise is to get the driver's attention through noise, and this can be disturbing to residences near the roadway. |
| Transverse Rumble Strips | ▪ They can help reduce speeds on the roadway in the area of the rumble strips.<br>▪ Cost effective. | ▪ One of the intents of the rumble noise is to get the driver's attention through noise, and this can be disturbing to residences near the roadway.<br>▪ Can impede snowplow operations. |
| Speed Humps | ▪ Appropriate for local and collector streets; mid-block or at intersections.<br>▪ Can be used on a one-lane one-way or two-lane two-way street.<br>▪ Can be designed to be temporary / removeable (however, it is possible that the seasonal removal of speed humps for plowing operations may result in increased vehicular speeds during the removal period).<br>▪ Average crash rate reduction of about 45 percent on treated streets based on FHWA Safety data. | ▪ Not appropriate for roads with posted speeds of 45 mph or more.<br>▪ If placed adjacent to a guardrail, there is a potential for an errant vehicle to vault over the guardrail.<br>▪ If placed on a roadway with no curb, some drivers may attempt to go around them with one or both tires.<br>▪ Can create an impediment to surface water drainage.<br>▪ Challenge for snowplow operators. |

| TABLE 2 continued: SUMMARY OF TRAFFIC CALMING OPTIONS | | |
|---|---|---|
| OPTION | ADVANTAGES | DISADVANTAGES |
| Warming or Regulatory Signs | ▪ Provide consistent rules for all drivers.<br>▪ Cost effective.<br>▪ Give drivers advance warnings to changing roadway conditions. | ▪ Too many signs lead to information overload.<br>▪ Can make drivers less attentive such that they overlook actual conditions. |

Conclusions and Recommendations

The proposed horizontal alignment of the road will serve as a passive traffic calming measure. If additional (active) traffic calming measures are requested, the Town could consider installing speed limit and curve warning signs and/or share the road signs on both sides approaching the dam crossing.

In addition, if the Town desires further traffic calming and speed reduction, we would recommend the installation of either temporary or permanent speed humps on each end of the dam, outside the limits of the guardrails.

ATTACHMENTS

Aesthetic Barrier

Steel-Backed Timber Rail, American Timber and Steel

*Aesthetic Barrier*

# Aesthetic Barrier

March 12, 2015

| NAME | MANUFACTURER | TEST LEVEL | | POST AND BLOCKOUT | RAIL | DISTINGUISHING CHARACTERISTICS |
|---|---|---|---|---|---|---|
| | | NCHRP 350 | MASH | | | |
| **FLEXIBLE SYSTEMS** | | | | | | |
| **NatureRail**<br><br>Gregory Highway Products<br><br>http://www.gregorycorp.com/highway_naturerail.cfm |  | TL-2 | | 6" diameter Wood-clad steel post.<br>NatureRail 2m - 5'-11 7/8" post, 6'-6 3/4" post spacing<br>NatureRail 4m - 5'-11 7/8" post, 13'-1 1/2" post spacing<br><br>Steel spacer unit separates the post from the rail.<br><br>No blockout. | Composite rail:<br><br>2m: Modified 7" diameter log and 3 15/16" x 3/16" x 13'-1 1/16" steel rail internally located in slotted wood rail with no exterior steel rail.<br><br>4m: Modified 7" diameter log and 3 15/16" x 3/16" x 13'-1 1/16" steel rail internally located in slotted wood rail with an additional steel rail mounted to the back of the wood rail. | Rail height 2'-3 1/2"<br><br>All wood appearance blends into the surrounding environment.<br><br>Dynamic Deflection 2m: 4'-7" and 4m - 6'-2".<br><br>Use along edge of roadway.<br><br>No crashworthy end terminal is currently available; acceptable end treatments include anchoring in a backslope or flaring the barrier to the edge of the clear zone. |
| **Ironwood Aesthetic Barrier**<br><br>West - East Partners, LLC<br><br>http://www.west-eastpartners.com/ |  | TL-3 | | S3 x 5.7, 5'-3" long steel post, with a 8" x 2' steel soil plate<br><br>Steel post encased by a 6 3/4" diameter wood sleeve.<br><br>Post Spacing 6'-6". | Composite rail: 8" diameter routed wood beams and 1/4" thick steel channel embedded in and bolted to the timber rail.<br><br>8" x 7 " rectangular timber rail - alternate design | Rail height 2'-2"<br><br>All wood appearance blends into the surrounding environment.<br><br>Dynamic deflection 5'-4 1/2"<br><br>No crashworthy end terminal is currently available; acceptable end treatments include anchoring in a backslope or flaring the barrier to the edge of the clear zone. |
| **High Tension Cable Barrier**<br>Brifen (WRSF)<br>http://www.brifenusa.com<br>Gibraltar<br>http://gibraltartx.com<br>Gregory Highway Products<br>http://www.gregorycorp.com/highway_safence.cfm<br>Nucor Steel Marion<br>http://nucorhighway.com/nu-cable.html<br>Trinity Highway Products<br>http://www.highwayguardrail.com/products/cb.html |  | TL-3 and TL-4 | | Sizes and post spacing designs vary.<br><br>Refer to manufacturer's specifications.<br><br>**For details on a specific system please go to manufacturer's website. For a comparisons of all systems, please refer to FHWA Cable Barrier Chart** | Three and four cable designs available. | All systems are propriety.<br><br>Blends in with surrounding environment, and reduces visual impairment.<br><br>Refer to manufacturer's specifications for distance from post to embankment hinge point.<br><br>Refer to manufacturer's specifications for availability of end treatments.<br><br>Steel posts are typically galvanized. Coating alternatives are available to enhance aesthetic appearance.<br><br>Use in medians and along edge of roadways. |

# Aesthetic Barrier

| NAME | MANUFACTURER | TEST LEVEL | | POST AND BLOCKOUT | RAIL | DISTINGUISHING CHARACTERISTICS |
|---|---|---|---|---|---|---|
| | | NCHRP 350 | MASH | | | |
| **SEMI-RIGID SYSTEM** | | | | | | |
| **Deception Pass Log Rail**<br>http://www.wsdot.wa.gov/Research/Reports/600/642.1.htm |  | TL-2 | | Reinforced concrete, rock and mortar, bollard posts designed to replicate the historic Civilian Conservation Corp construction.<br>18' bollard spacing<br>Intermediate spacing of 6" diameter steel posts.<br>No blockout. | Composite rail: Modified 12" diameter log and 6" x 6" x 3/8" steel plate embedded into the log rail. | Rail height 2'-3"<br>Wood and rock appearance blends into the surrounding environment.<br>Design reduces visual impairment of the environment.<br>No crashworthy end terminal is currently available; acceptable end treatments include anchoring in a backslope or flaring the barrier to the edge of the clear zone. |
| **TimBarrier StreetGuard Plus**<br>S.I. Storey Lumber Co.<br>http://www.sistoreylumber.com/pdf/StreetGuardPlusFlyer.pdf |  | TL-2 | | 6" x 8" x 6' long timber post<br>Wood blockouts 6" x 8" x 10"<br>Post spacing 8' | Composite rail: 4" x 12" x 7'-11" long timber rail backed by 1/4" x 6" x 7'-6" long steel plates. | Rail height 2'-5"<br>All wood appearance blends into the surrounding environment.<br>Use along edge of roadway.<br>No crashworthy end terminal is currently available; acceptable end treatments include anchoring in a backslope or flaring the barrier to the edge of the clear zone.<br>Dynamic deflection 4'-4". |
| **Steel-Backed Log Rail**<br>http://flh.fhwa.dot.gov/resources/pse/standard/#fp617 |  | TL-2 | | 12" diameter x 7' log post<br>Wood blockouts 8" x 6" x 8" notched into log post<br>Post spacing 10'. | Composite rail: Modified 10" diameter log rail, backed with 6" x 3/8" thick steel plate. | Rail height 2'-7"<br>Wood appearance blends into the surrounding environment.<br>No crashworthy end terminal is currently available; acceptable end treatments include anchoring in a backslope or flaring the barrier to the edge of the clear zone.<br>Dynamic deflection 4" |

# Aesthetic Barrier

| NAME | MANUFACTURER | TEST LEVEL | | POST AND BLOCKOUT | RAIL | DISTINGUISHING CHARACTERISTICS |
|---|---|---|---|---|---|---|
| | | NCHRP 350 | MASH | | | |
| **SEMI-RIGID SYSTEM** | | | | | | |
| **Steel-Backed Timber Guardrail** |  | TL-3 (with blockouts)<br><br>TL-2 (no blockouts) | | 10" x 12" x 7' long timber post.<br><br>Post spacing 5'.<br><br>Wood blockouts 4" x 9" x 12" | Composite Rail: 6" x 10" wood rail backed with a 3/8" thick steel plate. | Rail height 2'-3"<br><br>All wood appearance blends into the surrounding environment.<br><br>System can connect to Straight and Curved Stone Masonry Guardwall.<br><br>Dynamic deflection 1'-11" with blockout |
| **Steel Backed Timber Guardrail Tangent End Terminal**<br><br>http://flh.fhwa.dot.gov/resources/pse/standard/#fp617 |  | TL-2 | | The SBT end terminal is 40'-9" long and is designed to collapse when hit end-on.<br>9 - 6" x 10" weakened wood posts.<br>9 - 6" x 10" rail segment with angled ends and special attachment hardware. | | |
| **Merritt Parkway Aesthetic Guardrail**<br><br>Connecticut DOT<br><br>http://pubsindex.trb.org/view.aspx?id=474497 |  | TL-3 | | W6 x 15 X 6' - 6" steel post<br><br>Post below ground is galvanized.<br><br>Post Spacing 9'-6".<br><br>Wood blockout 4" x 8" x 11" | Composite Rail: 6" x 12" timber beams backed with 6" x 3/8" steel plates and splices to provide tensile continuity. | Rail Height 2'-6"<br><br>All wood appearance blends into the surrounding environment.<br><br>No crashworthy end terminal was developed for this system; acceptable end treatments include anchoring in a backslope or flaring the barrier to the edge of the clear zone.<br><br>A granite transition curbing is required at transition to a bridge parapet.<br><br>Dynamic deflection 3'-10" without a curb and 3'-4" when installed 12" behind a 4" sloped face curb. |
| **Rustic-appearance Metal Beam Guardrail** |  | TL-3 | | Uses wood or steel posts.<br><br>**For a complete comparisons of these systems, please refer to FHWA Roadside Post and Beam Chart** | Standard metal beam guardrail | Blends in with the surrounding environment<br><br>Propriety treatments to achieve rustic appearance on both post and rail elements: acid-etched, powder coated and weathered steel. |

# Aesthetic Barrier

| NAME | MANUFACTURER | TEST LEVEL | | COMPONENTS | CHARACTERISTICS |
|---|---|---|---|---|---|
| | | NCHRP 350 | MASH | | |
| **RIGID SYSTEM** | | | | | |
| **Random Rubble Cavity Wall**<br><br>http://www.efl.fhwa.dot.gov/files/technology/abs/Random-rubble/B181RubbleGuardwall-WFLHD-FIN.pdf |  | TL-1 | | Wall width 1'-6"<br><br>Composed of alternating height sections:<br>Section 1 is 1'-6" tall x 12' long<br>Section 2 is 2' tall x 5'-6" long.<br>Reinforced concrete footings and core wall are poured and stone placed prior to filling the cavity with concrete.<br><br>Rock size is between 12" and 1'-6" with smaller rocks and masonry mortar. | Wall height: 1'-6" and 2' alternating height sections<br><br>Stone facing blends into the surrounding environment.<br><br>No crashworthy end terminal is currently available; acceptable end treatments include anchoring in a backslope or flaring the barrier to the edge of the clear zone. |
| **Rough Stone Masonry Guardwall**<br><br>http://safety.fhwa.dot.gov/roadway_dept/policy_guide/road_hardware/barriers/pdf/b202.cfm |  | TL-2 | | Wall width: 2' single or 2'-3" double faced.<br><br>Three main components: reinforced concrete foundation slab, inner reinforced concrete core wall and rough stone masonry face with an attachment system.<br><br>Masonry face can have the projections a maximum of 1-1/2" beyond the working line. Avoid projections oriented toward oncoming traffic. Rake joints can be up to 2" deep, and mortar beds can be 2" - 3" thick. | Wall height: 1'-10"<br><br>Stone facing blends into the surrounding environment.<br><br>No crashworthy end terminal is currently available; acceptable end treatments include anchoring in a backslope or flaring the barrier to the edge of the clear zone. |
| **Rough Stone Masonry Guardwall**<br><br>http://safety.fhwa.dot.gov/roadway_dept/policy_guide/road_hardware/barriers/pdf/b64d.pdf |  | TL-3 | | Wall width: 2' single or double faced.<br><br>Three main components: reinforced concrete foundation slab, inner reinforced concrete core wall and rough stone masonry facing with an anchor attachment system.<br><br>Masonry face can have the projections a maximum of 1-1/2" beyond the working line. Avoid projections oriented toward oncoming traffic. Rake joints can be up to 2" deep, and mortar beds can be 2" - 3" thick. | Wall height: 2'-3"<br><br>Stone facing blends into the surrounding environment.<br><br>Used in medians when double-faced.<br><br>No crashworthy end terminal is currently available; acceptable end treatments include anchoring in a backslope or flaring the barrier to the edge of the clear zone. |

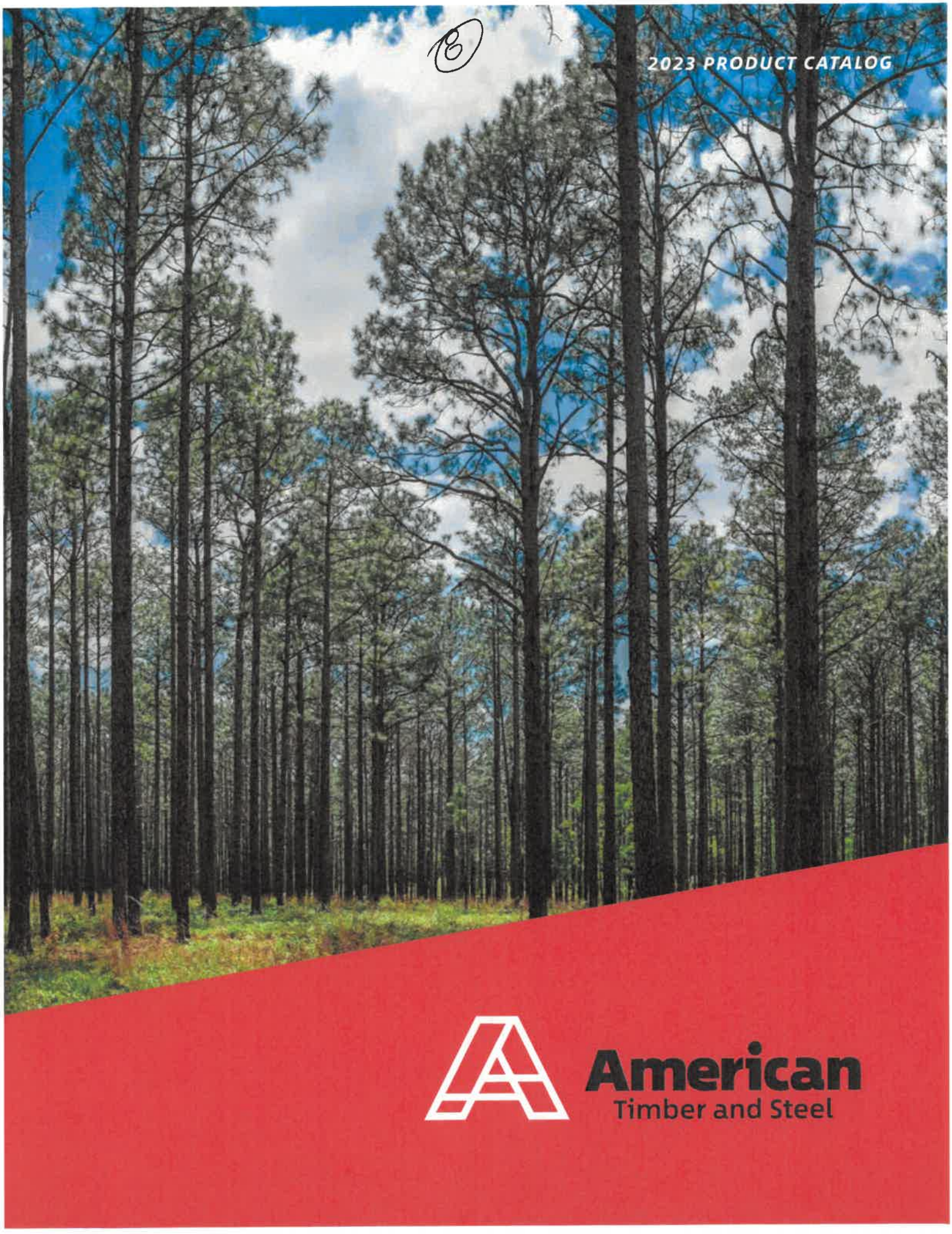
# Aesthetic Barrier

| NAME | MANUFACTURER | TEST LEVEL | | COMPONENTS | CHARACTERISTICS |
|---|---|---|---|---|---|
| | | NCHRP 350 | MASH | | |
| **RIGID SYSTEM** | | | | | |
| **Smooth Stone Masonry Guardwall**<br><br>http://flh.fhwa.dot.gov/resources/pse/standard/#fp620 |  | TL-3 | | Wall width: 2' single or double faced.<br><br>Three main components: reinforced concrete foundation slab, inner reinforced concrete core wall and rough stone masonry face with an attachment system.<br><br>Masonry face can have the projections a maximum of 1-1/2" beyond the working line. Avoid projections oriented toward oncoming traffic. Rake joints can be up to 2" deep, and mortar beds can be 2" - 3" thick. | Wall height: 2'-3" with 3" crenulations above primary height.<br><br>Stone facing blends into the surrounding environment.<br><br>No crashworthy end terminal is currently available; acceptable end treatments include anchoring in a backslope or flaring the barrier to the edge of the clear zone. |
| **Precast Concrete Guardwall**<br><br>http://flh.fhwa.dot.gov/resources/pse/standard/#fp618 |  | TL-3 | | Wall width 2'-2"<br><br>10-ft long pre-cast units include 12 inch deep footings.<br><br>Foundation, core, and concrete stone facing are precast as a single unit. | Wall height: 2'-3-1/2"<br><br>Precast concrete stone facing and capstone blend into the surrounding environment.<br><br>Use in medians if double-faced or along edge of roadway.<br><br>Approved for use with 4" mountable curb at any offset.<br><br>No crashworthy end terminal is currently available; acceptable end treatments include anchoring in a backslope or flaring the barrier to the edge of the clear zone. |
| **Stone Cast Barrier**<br><br>Stonecastinc@gmail.com<br><br>Stone Cast, Inc.<br><br>http://safety.fhwa.dot.gov/roadway_dept/policy_guide/road_hardware/barriers/pdf/b-73.pdf |  | TL-3 | | Unit dimension: 2'-7" tall; 1'-7" width at top and 2' at bottom.<br><br>Unit footing: 1' deep x 4' wide, cast integrally with its stem.<br><br>Foundation, stem , and stone veneer cast integrally as a single unit.<br><br>Units can be made in 5',10' or 20' long segments, and can be curved to fit a specified radius | Wall height: 2'-7"<br><br>No crashworthy end terminal is currently available; acceptable end treatments include anchoring in a backslope or flaring the barrier to the edge of the clear zone. |

# Aesthetic Barrier

| NAME | MANUFACTURER | TEST LEVEL | | COMPONENTS | CHARACTERISTICS |
|---|---|---|---|---|---|
| | | NCHRP 350 | MASH | | |
| **RIGID SYSTEM** | | | | | |
| **California's Type 60 Concrete Barrier**<br><br>e.g.: Mission Arch, Deep Cobblestone Reveal, Dry stack, Fracture Granite |  <br>  | TL-3 | | Barrier has a constant single slope approximately 9 degs from the vertical.<br><br>General texture guidelines:<br><br>1. Sandblast textures with a maximum relief of 1/5".<br>2. Images or geometric patterns inset into the face of the barrier 1" or less and having 45-deg or flatter chamfered or beveled edges.<br>3. Textures or patterns of any shape and length inset into the face of the barrier up to the 1/2" deep and 1" width.<br>4. Any pattern or texture with gradual undulations that have a maximum relief of 3/4" over a distance of 1'.<br>5. Gaps, slots, grooves or joints of any depth with a maximum width of 3/4" and a maximum surface differential across these features of 1/5" or less.<br>6. Any pattern or texture with a maximum relief of 2-1/2", if such pattern begins 2' or higher above the base of the barrier and all leading edges are rounded or sloped. No part of this pattern or texture should protrude above the plane of the lower, untextured portion of the barrier. | Wall height: 2'-3" (vertical wall) to 2'-8" (single-slope barrier)<br><br>No crashworthy end terminal is currently available; acceptable end treatments include anchoring in a backslope or flaring the barrier to the edge of the clear zone. |

*Steel-Backed Timber Rail*


2023 PRODUCT CATALOG
American
Timber and Steel

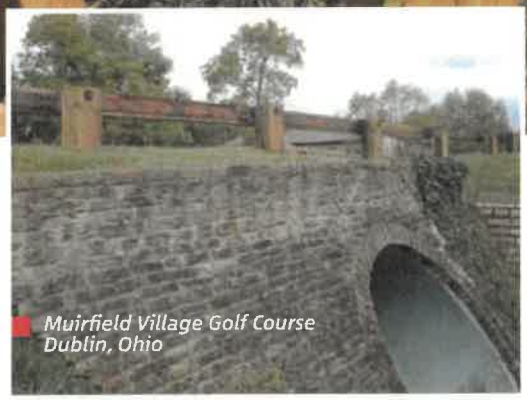
## Steel-Backed Timber and Steel-Backed Log Rail

*Our Steel-Backed Timber and Log Guardrail systems are not only beautiful but they have been designed for rugged highway use, crash tested and they meet Federal Highway Administration (FHWA) approval. The Square Steel-Backed Timber also has a TL-2 end terminal system available for another safety feature.*

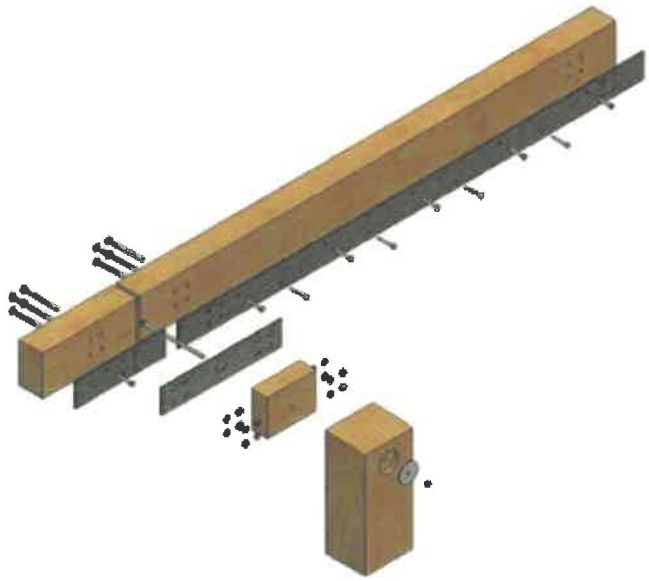
*Hidden behind each rail spans a steel plate with matching splice plates and steel hardware in either galvanized or corten (A588 weathering steel). The system is produced using large solid Southern Yellow Pine timbers for a sawn look or logs for a rounded look and has the steel rail plate pre-attached for ease of installation.*

*This system is very popular along scenic roadways across the country. The wood is treated to .60 CCA and can be left to weather naturally or may be stained or painted to match its surroundings.*

Rocky Mountain National Park



Muirfield Village Golf Course
Dublin, Ohio



Steamboat, Colorado



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