

EXECUTIVE SUMMARY
Creek Road Erosion Stability Study Report
Middlebury, Vermont



Study Area



Creek Road (north) & Otter Creek



Creek Road (south) & Otter Creek



Three Mile Bridge Road & Middlebury River

Prepared for:

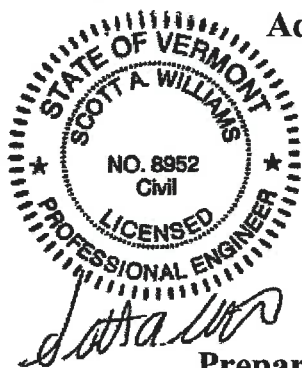
Addison County Regional Planning Commission

14 Seminary Street
Middlebury, Vermont 05753

and

Town of Middlebury

77 Main Street
Middlebury, Vermont 05753



Preparation Date: May 26, 2017 (Revised June 16, 2017)
(Pathways Project No. 12688)

Prepared By:

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1.0 EXECUTIVE SUMMARY

Creek Road has been closed to vehicular traffic beginning at a point approximately 2.2 miles south of Route 7 to Three Mile Bridge Road since the spring of 2015 due to safety concerns posed by significant bank erosion and damage to the road in several areas. The road experiences periodic flooding from Otter Creek and the Middlebury River. These significant flood events often overtop the road surface and result in significant flooding of the neighboring fields and residential properties. These flood conditions result in damage to the road, impact the use of the road, and limit access to neighboring properties and emergency vehicles.

The Addison County Regional Planning Commission (ACRPC), on behalf of the Town of Middlebury (Town), issued a Request for Proposals on November 11, 2015 entitled “Middlebury Creek Road Erosion Stability Study,” to retain an engineering consultant to review flooding and bank erosion along Creek Road and Otter Creek. On February 25, 2016, ACRPC and the Town hired Pathways Consulting, LLC, and its sub-consultant, Headwaters Hydrology, PLLC, to complete the study.

The goal of the study was to assess the nature of flooding and bank erosion along Otter Creek, explore strategies for stabilizing the banks on Creek Road, identify lower cost, sustainable alternatives for re-opening the road, and provide alternative designs with cost estimates. The study area included Creek Road beginning 1,500 feet south of Route 7, and extending to the southern end of Creek Road, and 400 feet east on Three Mile Bridge Road. The study area encompassed Otter Creek, a portion of the Middlebury River, and the surrounding floodplains along these roads. The study included: site review and limited surveying within the study area; generating an existing conditions plan showing relevant properties and natural resources; a Stream Geomorphic Assessment (SGA) focused on Otter Creek and the Middlebury River bank erosion and flooding; an alternative design review process with ACRPC, Town staff, and a public representative; a public consensus process including a questionnaire and public meeting (September 7, 2016); and summarizing the findings and recommendations in a final study report.

The SGA and site review concluded that Otter Creek was generally stable, but the bank erosion was symptomatic of the close proximity of Creek Road to Otter Creek, and the lack of an adequately vegetated riparian buffer between the road and banks. The short segment of the Middlebury River was not as stable, and the bank erosion along Three Mile Bridge Road has resulted from an on-going channel adjustment process that will likely continue, suggesting that the road should be moved in this area. The study considered the following alternative designs to address the road deficiencies: relocating a large portion of the road to the east; abandoning sections of the road; shifting the road east to restore a 25-foot buffer between the road and stream banks; stabilizing the banks in-place; converting portions of the road to a multi-use path; implementing minimum road improvements to re-open the road; and closing the road.

After careful consideration with the project team, the design recommendation #1 (shifting the road to restore a 25-foot buffer) seemed to be the most cost-effective and feasible approach that balances cost with the need to move the road away from the streams, restoring a riparian buffer, and minimizing the impacts to natural resources and adjacent properties. See below for a Design Recommendation #1-4 Comparison Table prepared

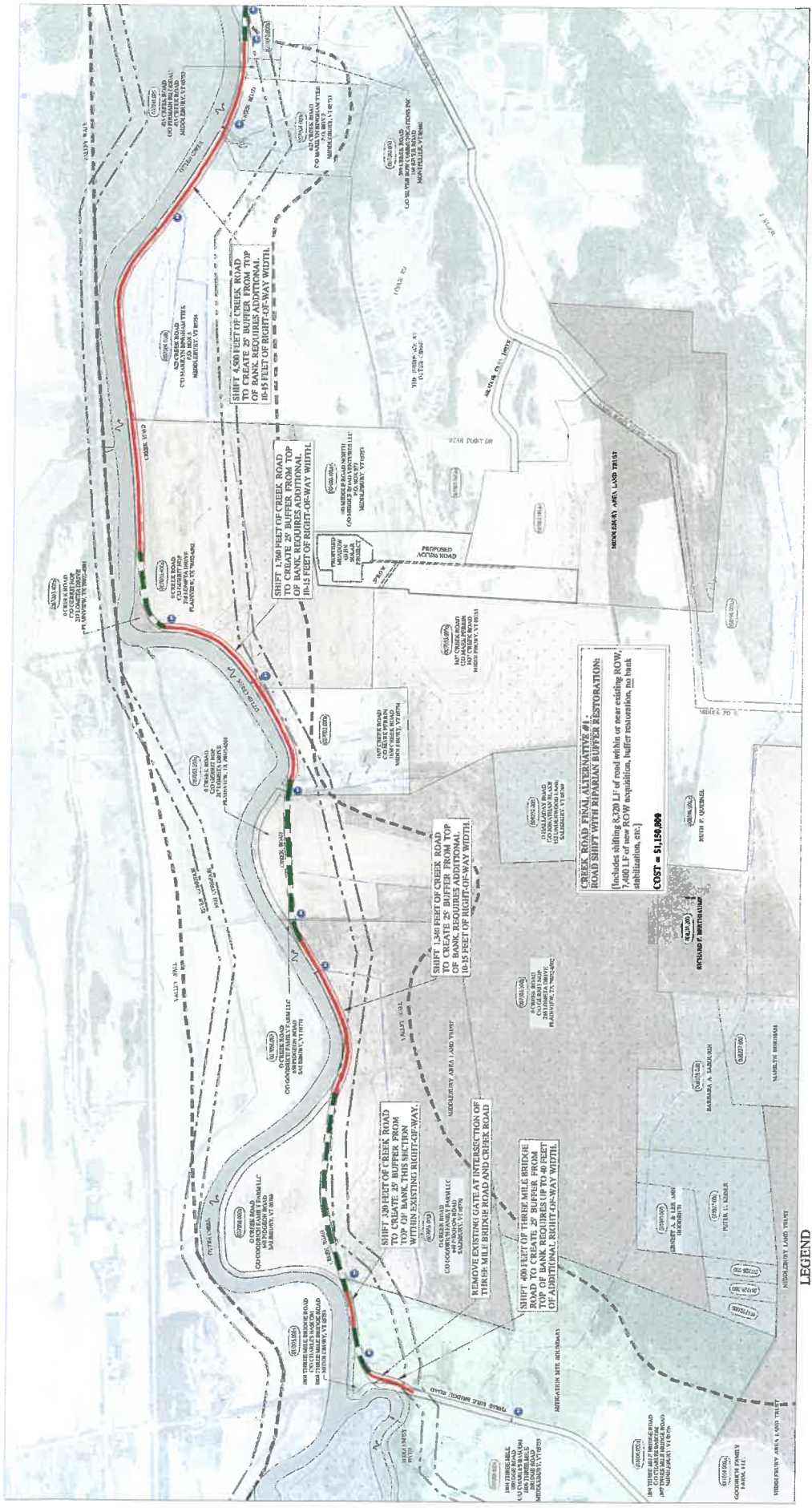
for the final recommendations, and a plan and typical cross sections for Design Recommendation #1 (also included in Appendices J, K, and L).

DESIGN RECOMMENDATIONS #1-4 COMPARISON TABLE
FOR
ADDISON COUNTY REGIONAL PLANNING COMMISSION - MIDDLEBURY CREEK ROAD EROSION STABILITY STUDY
CREEK ROAD, MIDDLEBURY, VERMONT
PREPARED BY PATHWAYS CONSULTING, LLC (Project No. 11926)
PATHWAYS PROJECT NO. 12688
DATED: MAY 23, 2017

	DESIGN ALTERNATIVES				
	NO BUILD	DESIGN RECOMMENDATION #1	DESIGN RECOMMENDATION #2	DESIGN RECOMMENDATION #3	DESIGN RECOMMENDATION #4
CRITERIA	Existing Creek Road	Shift 8,320 LF of existing Creek Road to east within or near existing right-of-way to restore 25 foot riparian buffer between Creek Road and Otter Creek	<u>AND</u> Complete minimum roadway improvements on 12,400 LF of Creek Road including roadway resurfacing, fabric stabilization, new and existing drainage improvements, and ditching	Complete full bank stabilization measures on 2,200 LF (critical areas) of Creek Road/Otter Creek <u>AND</u> Construct new 2,000 LF road connection from Creek Road to Meadow Glen Drive <u>AND</u> Shift 4,210 LF of existing Creek Road to east within or near existing right-of-way to restore 25 foot riparian buffer between Creek Road and Otter Creek <u>AND</u> Abandon 4,800 LF segment of north Creek Road	Implement minimum maintenance measures on 12,400 LF of Creek Road including roadway resurfacing, fabric stabilization, new and existing drainage improvements, and ditching

DESIGN AND CONSTRUCTION IMPACT					
New Road Alignment Required	None	8,320 LF (partial)	None	2,000 LF	None
Right-of-Way (ROW) or Easement Acquisition Required	None	7,400 LF of ROW (average 10-15 foot width) on 7 private properties	None	2,000 LF of 60-foot ROW on two private properties; and 3,970 LF (average 10-15 foot wide) on 6 private properties	None
Change to Private Property Access	None	None	None	One new driveway may be needed; 2 properties impacted	None
Construction Cost (including Engineering/Permitting)	None	\$1,150,000	\$1,469,000.00	\$1,388,000	\$530,000
Level of Future Maintenance/Cost (High/Medium/Low/None)	High	Low	Medium	Low	High
Construction Duration (assuming single phase)	None	12 months (two construction seasons)	6 months (one construction season)	12 months (two construction seasons)	6 months (one construction season)
Level of Regulatory Review (High/Moderate/Low/None)	None	Low	Moderate	Moderate	Low
Permitting Duration (High/Moderate/Low/None)	None	Moderate	High	Moderate	Low
Potential for Grant Funding	None	Yes	Possible	Possible	No
Require Private Land Owner Approval	None	Yes	No	Yes	No
Drainage Improvements Along Creek Road (Significant/Limited/None)	None	Significant	Significant	Limited	Significant

RESOURCE IMPACT					
Impact on River Corridor	None - 12,000 LF of Creek Road remains in River Corridor	None	None - 12,000 LF of Creek Road remains in River Corridor	Removes 4,800 LF of Creek Road from River Corridor	None - 12,000 LF of Creek Road remains in River Corridor
Water Quality Improvements in Otter Creek & Middlebury River (Significant/Limited/None)	None	Significant	Limited	Significant	Limited
Reduce Erosion Along Otter Creek & Middlebury River (High/Moderate/Low/None)	None	High	High	High	Low
Wetland Impacts	None	1.1 acres	2.0 acres	1.1 acres	1.5 acres
Floodplain Impacts (Significant/Limited/None)	None	Limited	Limited	Significant	Limited
Conservation Easement Impacts (Significant, Limited, None - Property Identify)	None	Limited - MALT (Candido & Seeley), Ducks Unlimited Mitigation Site	None	Significant - MALT (Candido & Seeley), Ducks Unlimited Mitigation Site	None
Enhancement of Public Amenities/Access	None	No Change	No Change	Yes	No Change
Creek Road Remain Open to Vehicular Traffic	No	Yes	Yes	Yes	Yes
Impact to Current Traffic Patterns	No	No	No	Yes	No



CREEK ROAD EROSION STUDY
 MIDDLEBURY, VERMONT
DESIGN RECOMMENDATION #1 PLAN - ROAD
SHIFT WITH RIPARIAN BUFFER RESTORATION
 PATHWAYS CONSULTING, LLC
 MAY 23, 2017

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- LEGEND**
- MIDDLEBURY AREA LAND TRUST
 - MITIGATION SITE BOUNDARY
 - WETLANDS - VSWI
 - WETLANDS - ADVISORY
 - EXISTING STREAM / DITCH
 - EXISTING CULVERT (CREEK ROAD)
 - EXISTING CREEK ROAD TO REMAIN
 - SHIFT CREEK ROAD WITHIN EXISTING RIGHT-OF-WAY TO RESTORE 25-FOOT RIPARIAN BUFFER
 - SHIFT CREEK ROAD OUTSIDE EXISTING RIGHT-OF-WAY TO RESTORE 25-FOOT RIPARIAN BUFFER (REQUIRES ADDITIONAL 10-40 FEET OF RIGHT-OF-WAY)

LEGEND

--- MIDDLEBURY AREA LAND TRUST

--- MITIGATION SITE BOUNDARY

--- WETLANDS - VSWI

--- WETLANDS - ADVISORY

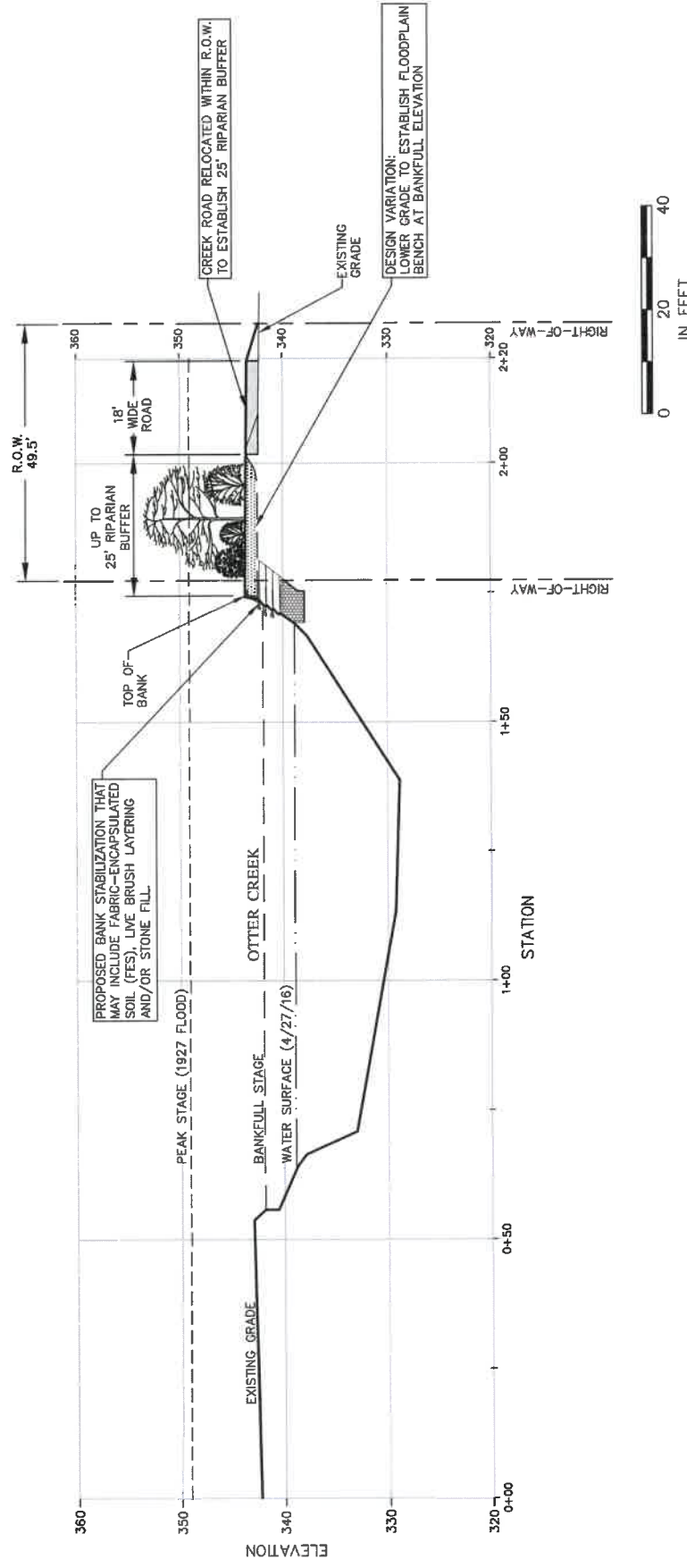
--- EXISTING STREAM / DITCH

● EXISTING CULVERT (CREEK ROAD)

0 500 1000 1500 2000
 IN FEET

N

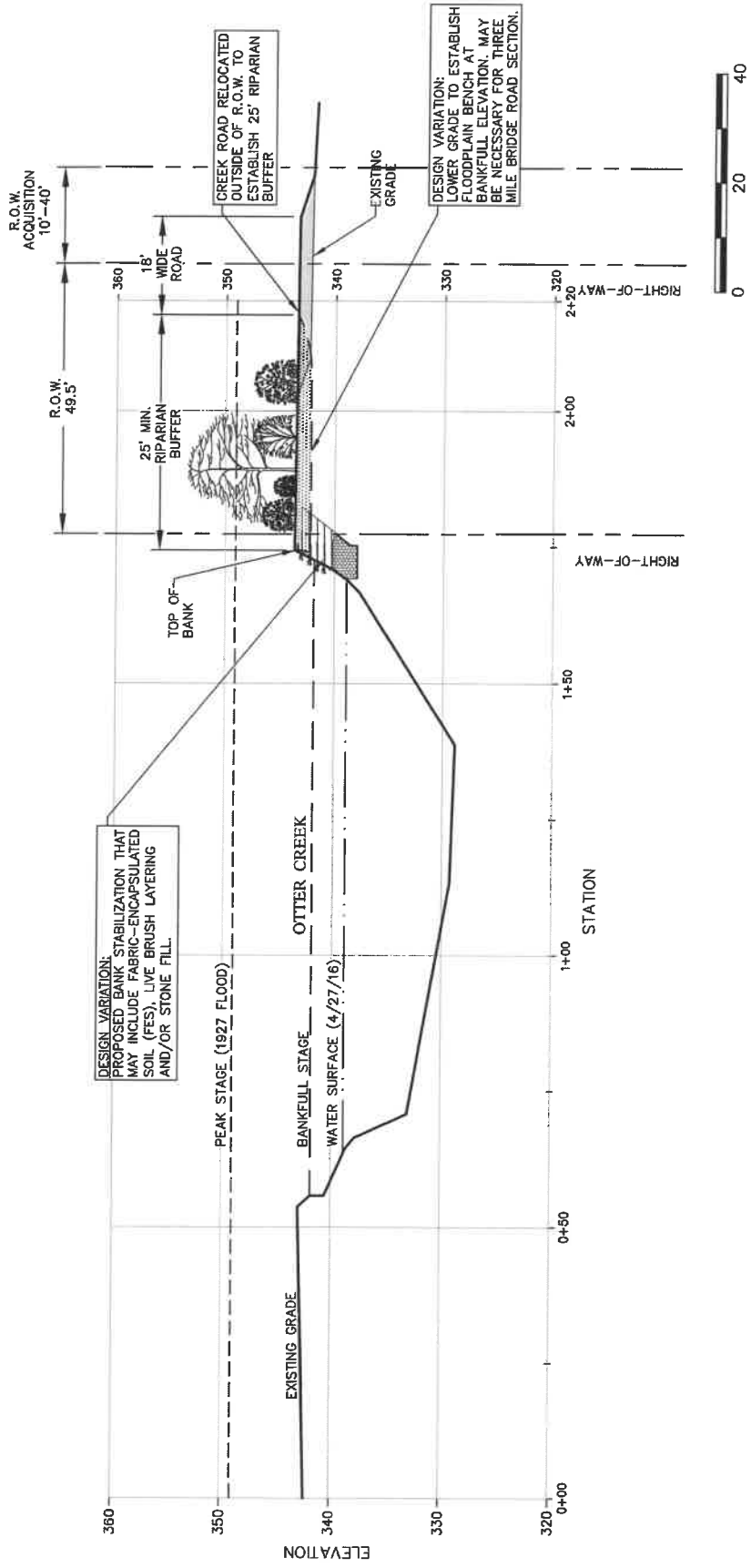




TYPICAL CROSS-SECTION - ROAD SHIFT WITHIN R.O.W. WITH BANK STABILIZATION (DESIGN RECOMMENDATION #1)

SCALE AS SHOWN

5



TYPICAL CROSS-SECTION - ROAD SHIFT OUTSIDE R.O.W. WITH 25' RIPARIAN BUFFER (DESIGN RECOMMENDATION #1)

SCALE: AS SHOWN

