Evaluation Criteria

	Community			Environmental					Construction		Financial		
	Cultural Impacts			Permitting Requirements									
	Archaeology (below ground)	Historic Architecture	Recreation/ Community Impacts	Permit Complexity	Tree Reforestation	Threatened + Endangered Species Impacts	Aesthetic Impacts	Right-of-Way (ROW) Impacts	Impacts to Community and Traffic	Construction Safety and Risk	Service Life	Maintenance Requirements	Capital Cost
High	Recently surveyed archaeological site(s) within footprint of proposed alternative.	Surveyed above ground resource(s) present in the project's viewshed and directly/ physically impacted by the project.	Permanent net loss of recreational access after construction (including parking spaces).	NJDEP/U.S. Army Corps of Engineers (USACE) Individual Permits required. Estimated permit approvals 8-16 months. The project meets Stormwater "Major Development".	Tree impacts meet the qualifications for NJDEP "No Net Loss Reforestation" Program, however, off-site reforestation options have to be identified. If off-site reforestation options cannot be met, monetary compensation may be required.	"Incidental Take" of species or habitat is required during active seasons. Further studies may be required. Mitigation may be required. Multiple construction timing restrictions anticipated. Construction monitoring may be required.	Introduction of mitigation element(s) that are visible. Blending of natural elements is not possible.	Permanent ROW impacts.	Long Term Detour (1- or 2-way).	Many unknowns, complex structural geology, unstable existing conditions, unusual construction techniques, difficult access.	Less than 20 years	Highly specialized personnel / repair mitigation measures.	Cost estimate being updated; will be presented at Meeting #3
Medium	Previously surveyed archaeological site(s), but not confirmed through current archaeological survey.	Surveyed above ground resource(s) present in the project's viewshed but partially obscured by vegetation or no change to context/setting.	Temporary impacts to recreational access during construction.	NJDEP Freshwater Wetlands/Flood Hazard Control Act General Permits/USACE Nationwide Permits required. Estimated permit approvals 4-6 months. The project does not meet Stormwater "Major Development".	Tree impacts meet the qualifications for NJDEP "No Net Loss Reforestation" Program; however, on-site reforestation can be conducted.	Potential impacts are identified as part of the Categorical Exclusion Document (CED). Further consultation with regulatory agencies required for construction alternatives and outlined solutions to minimize impacts. Timing restrictions may be required.	Introduction of mitigation element(s) that are visible but blending of natural elements is possible.	Temporary ROW impacts.	Short Term Road Closure (15 mins max.) / Daily Closure (1-way).	Few unknowns, average geometry, standard construction practices and techniques, typical access.	20 to 50 years	Regular removal of rock material from catchment ditch area.	
Low	No known archaeological sites present within the footprint of the proposed alternative.	No historic architectural resources present in the project's viewshed.	Maintain access to recreational facilities (trails/hiking) throughout construction and post construction.	All proposed work within NJDOT ROW. No impacts to wetlands and/or streams, transition areas, riparian buffers, floodplains that require NJDEP/USACE permits. The project does not meet Stormwater "Major Development".	Tree impacts are less than 0.50 acres and does not meet qualifications for NJDEP "No Net Loss Reforestation" Program.	No impacts or minimal habitat impacts are identified as part of the CED. Clearly shows how the proposed solution will minimize potential environmental impacts and outline for achieving approvals. Further consultation with regulatory agencies minimal.	Select vegetation and rock removal.	No temporary nor permanent ROW impacts.	Maintain 2-way traffic.	Minor unknown, simple geometry, few third party involvement, and simple construction practices and techniques.	More than 50 years	Regular inspection; no specialized personnel.	

Rating Criteria for Alternatives

Impact of Alternative

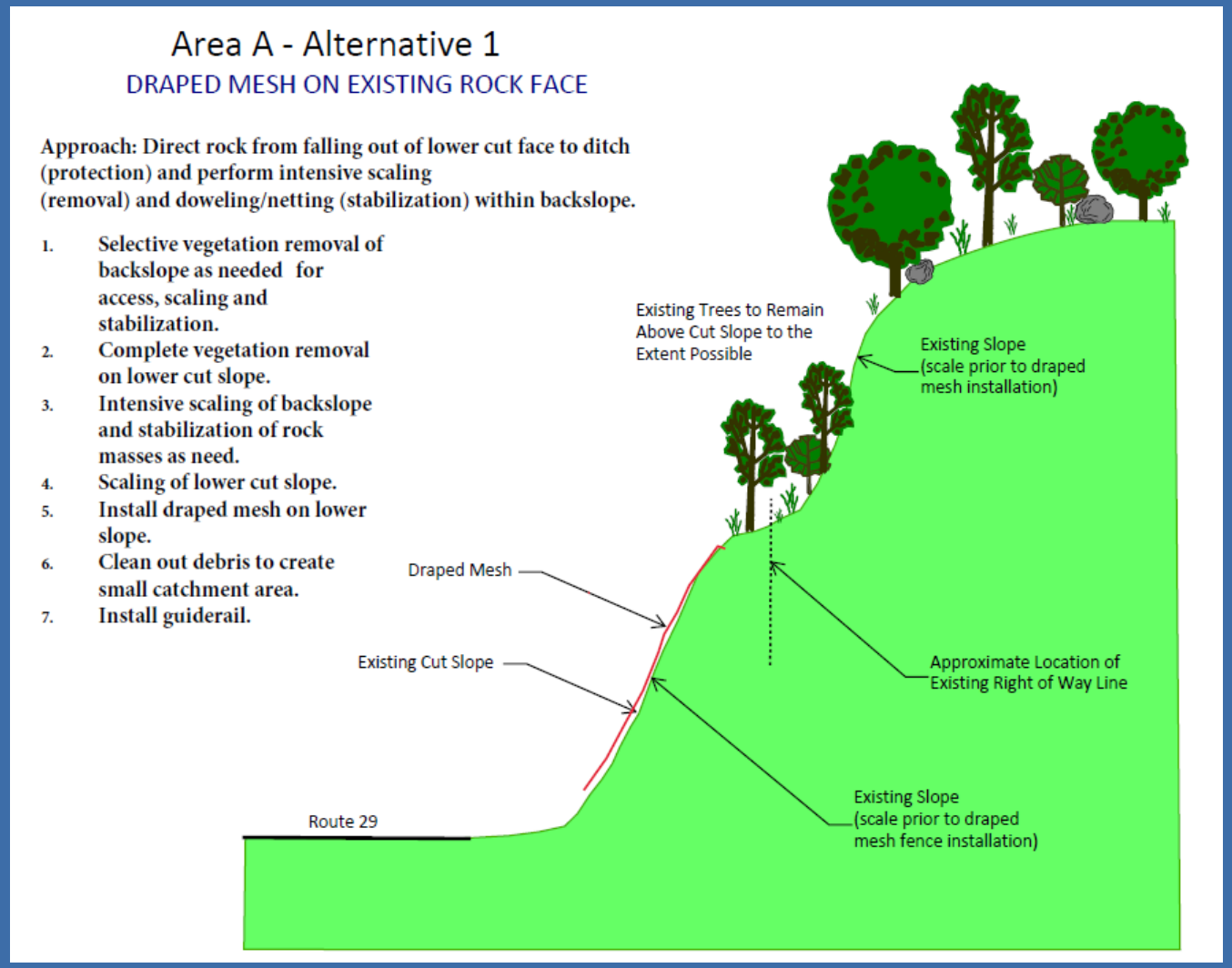
Rating Criteria		Definition	Low	Medium	High
Safety	Adequate Risk Reduction	An objective measure of the effectiveness of the alternative in reducing rockfall risk or from slope instabilities, to the roadway/traveling public.	At least 95% rock retained	--	< 95% rock retained
Community	Archaeology	Potential to impact below ground resources (archaeology) or above ground resources (historic architecture).	No known sites in footprint	Updated survey needed	Known sites in footprint
	Historic Architecture		No impact to visibility	Present / No effect	High impact to visibility
	Recreation/Community Impacts	Potential to impact recreational access.	No impact	Temporary impacts	High impact
Environmental	Permit Complexity	Note that all areas will be viewed as one project during the permitting process.	No impacts need permits	NJDEP / USACE General Permits	NJDEP / USACE Individual Permits
	Tree Reforestation		< 0.5 acres; no NJDEP Not Net Loss (NNL)	NJDEP NNL; onsite reforestation options	NNL / Offsite reforestation
	Threatened and Endangered Species Impacts		No impacts	Potential impacts	Direct Impact

Rating Criteria for Alternatives

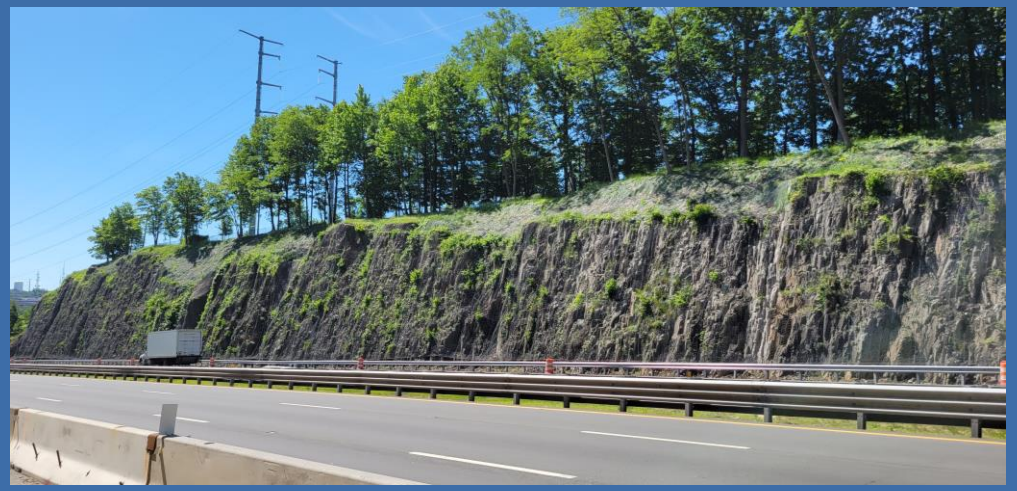
Impact of Alternative

Rating Criteria		Definition	Low	Medium	High
Environmental (contd.)	Aesthetic Impacts	Visual effects after construction to roadway users, D&R Canal State Park, and the general public.	Select vegetation or rock removal	Blending possible	Blending not possible
	Right-of-Way (ROW) Impacts	Magnitude and disturbance to land beyond NJDOT ROW.	No temporary or permanent impacts	Temporary impacts	Permanent impacts
Construction	Impacts to Community and Traffic	Impacts to roadway traffic (from road closures, detours).	Maintain 2-way traffic	Short-term closure / detour	Long-term detour
	Construction Safety and Risk	Estimate of construction complexity and difficulty, in regard to access, safety of workers, availability of qualified contractors, specialized machinery, etc.	Simple construction	Standard construction	Complex construction
Financial	Service Life	Lifespan of the remedial alternative in which it still performs effectively before needing replacement, major repairs, or upgrades.	> 50 years	20-50 years	< 20 years
	Maintenance Requirements	Need for maintenance of remedial systems, or of resultant need for maintenance on the roadway by NJDOT from slope failures.	Regular inspection	Regular debris cleanup	Specialized repair
	Capital Cost	Cost estimate is being updated and will be presented at Meeting #3.			

Alternative 1: Draped mesh on existing rock face



Alternative 1: Draped Mesh on Existing Rock			
Safety		Safety (Adequate Risk Reduction)	
Community	Cultural Impacts	Archaeology	
		Historic Architecture	
		Recreation/Community Impacts	
Environmental	Permitting Requirements	Permit Complexity	
		Tree Reforestation	
		Threatened and Endangered Species Impacts	
		Aesthetic Impacts	
		Right-of-Way Impacts	
Construction		Impacts to Community and Traffic	
		Construction Safety and Risk	
Financial		Service Life	
		Maintenance Requirements	
		Capital Cost	



Example: Route 280 Eastbound, West Orange

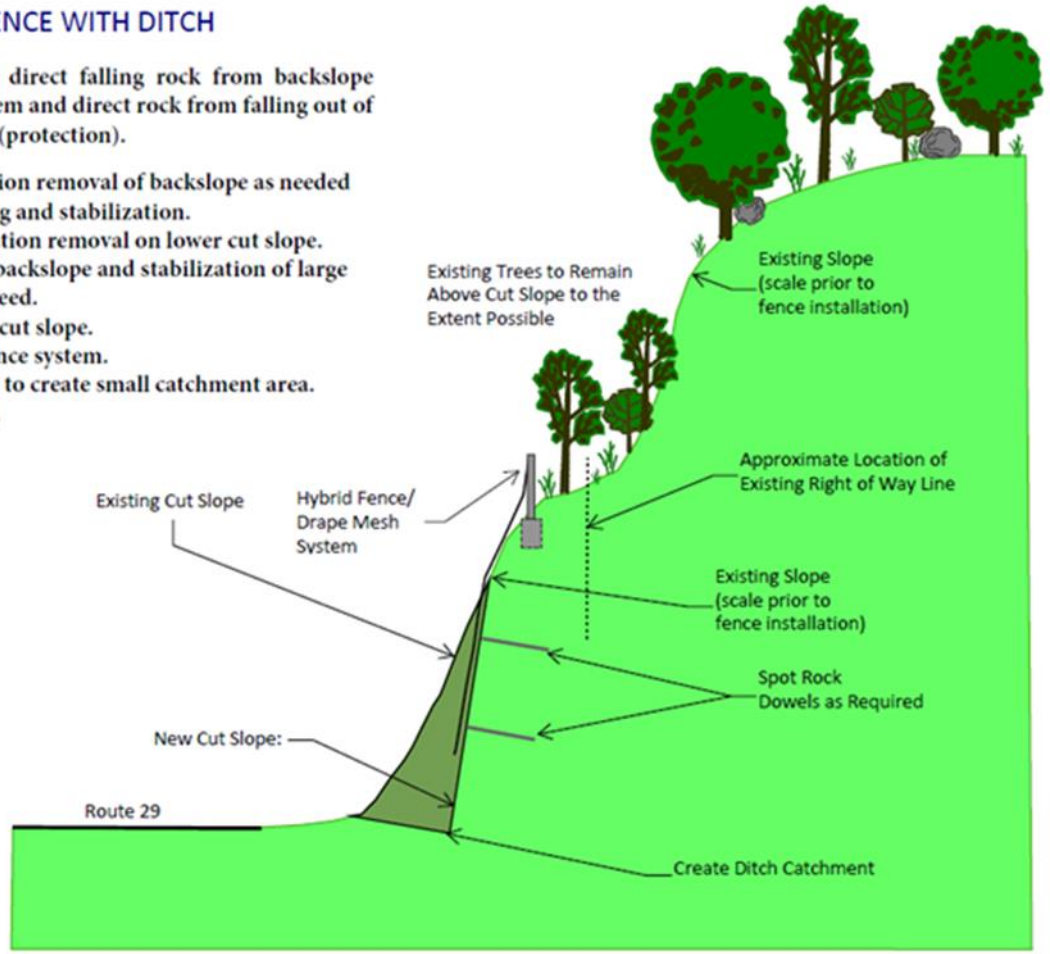
Alternative 2: Hybrid mesh with ditch

Area A - Alternative 2

HYBRID FENCE WITH DITCH

Approach: Catch and direct falling rock from backslope with hybrid fence system and direct rock from falling out of lower cut face to ditch (protection).

1. Selective vegetation removal of backslope as needed for access, scaling and stabilization.
2. Complete vegetation removal on lower cut slope.
3. Light scaling of backslope and stabilization of large rock masses as need.
4. Scaling of lower cut slope.
5. Install hybrid fence system.
6. Clean out debris to create small catchment area.
7. Install guiderail.



Alternative 2: Hybrid Fence with Ditch			
Safety		Safety (Adequate Risk Reduction)	
Community	Cultural Impacts	Archaeology	
		Historic Architecture	
		Recreation/Community Impacts	
Environmental	Permitting Requirements	Permit Complexity	
		Tree Reforestation	
		Threatened and Endangered Species Impacts	
		Aesthetic Impacts	
		Right-of-Way Impacts	
Construction		Impacts to Community and Traffic	
		Construction Safety and Risk	
Financial		Service Life	
		Maintenance Requirements	
		Capital Cost	

Example: Route 280 Eastbound, West Orange

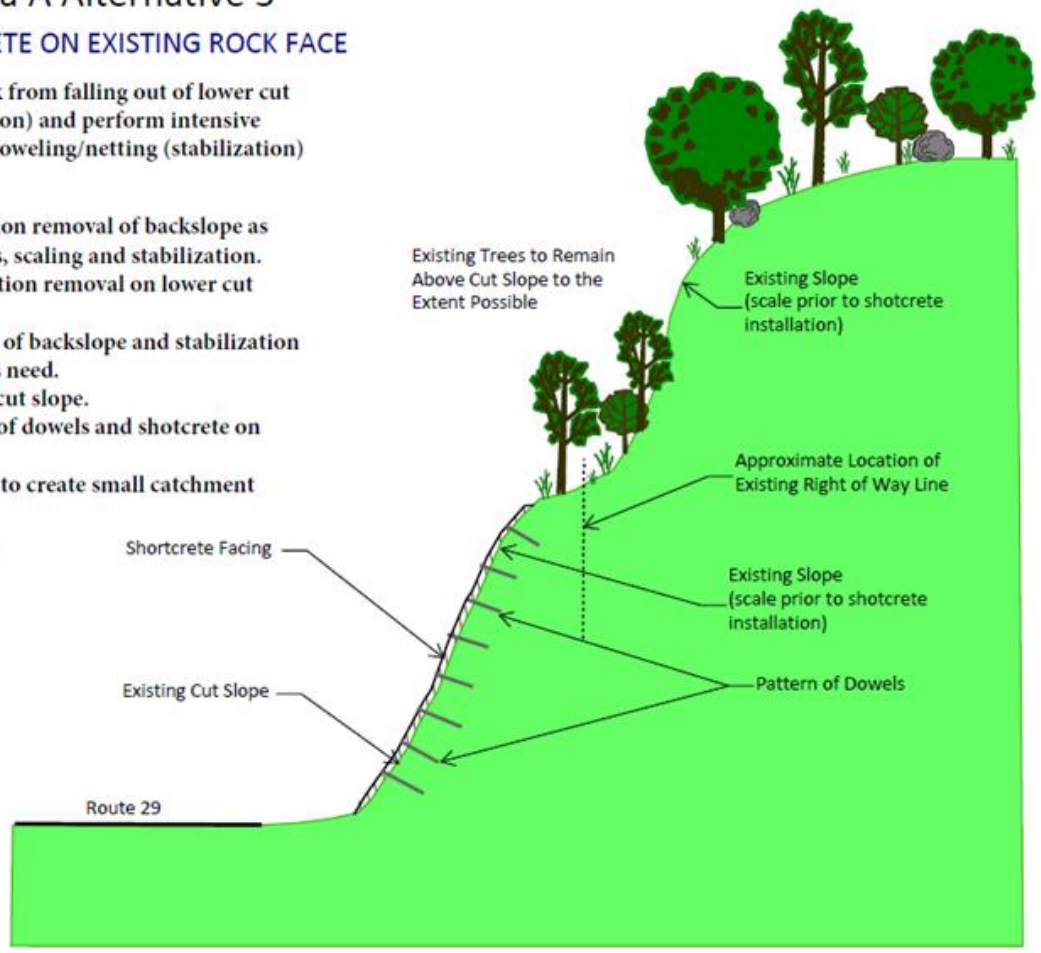
Alternative 3: Shotcrete on existing rock face

Area A Alternative 3

SHOTCRETE ON EXISTING ROCK FACE

Approach: Prevent rock from falling out of lower cut face to ditch (stabilization) and perform intensive scaling (removal) and doweling/netting (stabilization) within backslope.

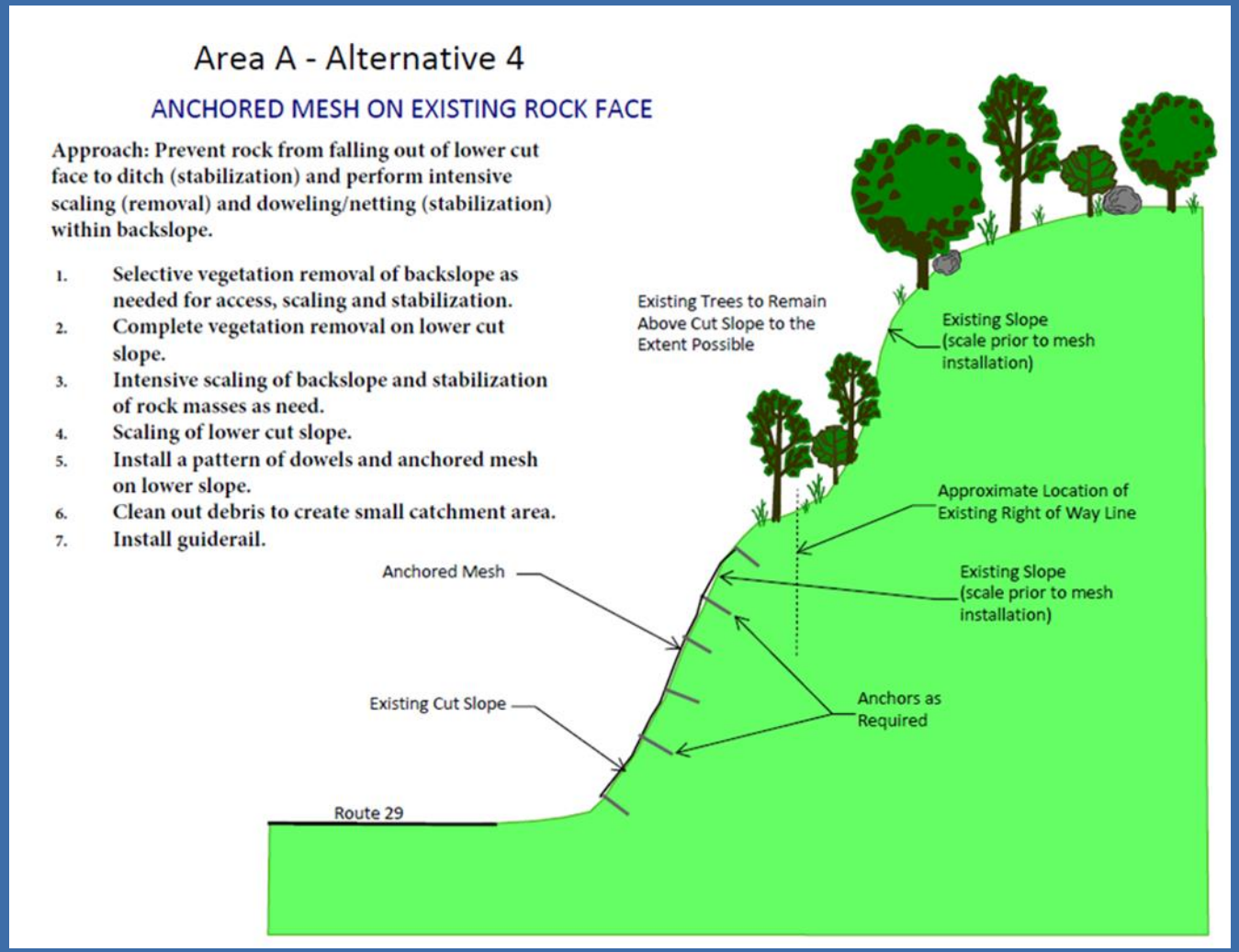
1. Selective vegetation removal of backslope as needed for access, scaling and stabilization.
2. Complete vegetation removal on lower cut slope.
3. Intensive scaling of backslope and stabilization of rock masses as need.
4. Scaling of lower cut slope.
5. Install a pattern of dowels and shotcrete on lower slope.
6. Clean out debris to create small catchment area.
7. Install guiderail.



Alternative 3: Shotcrete on Existing Rock Face			
Safety		Safety (Adequate Risk Reduction)	
Community	Cultural Impacts	Archaeology	
		Historic Architecture	
		Recreation/Community Impacts	
Environmental	Permitting Requirements	Permit Complexity	
		Tree Reforestation	
		Threatened and Endangered Species Impacts	
		Aesthetic Impacts	
		Right-of-Way Impacts	
Construction		Impacts to Community and Traffic	
		Construction Safety and Risk	
Financial		Service Life	
		Maintenance Requirements	
		Capital Cost	

Example: Route 280 Eastbound, West Orange

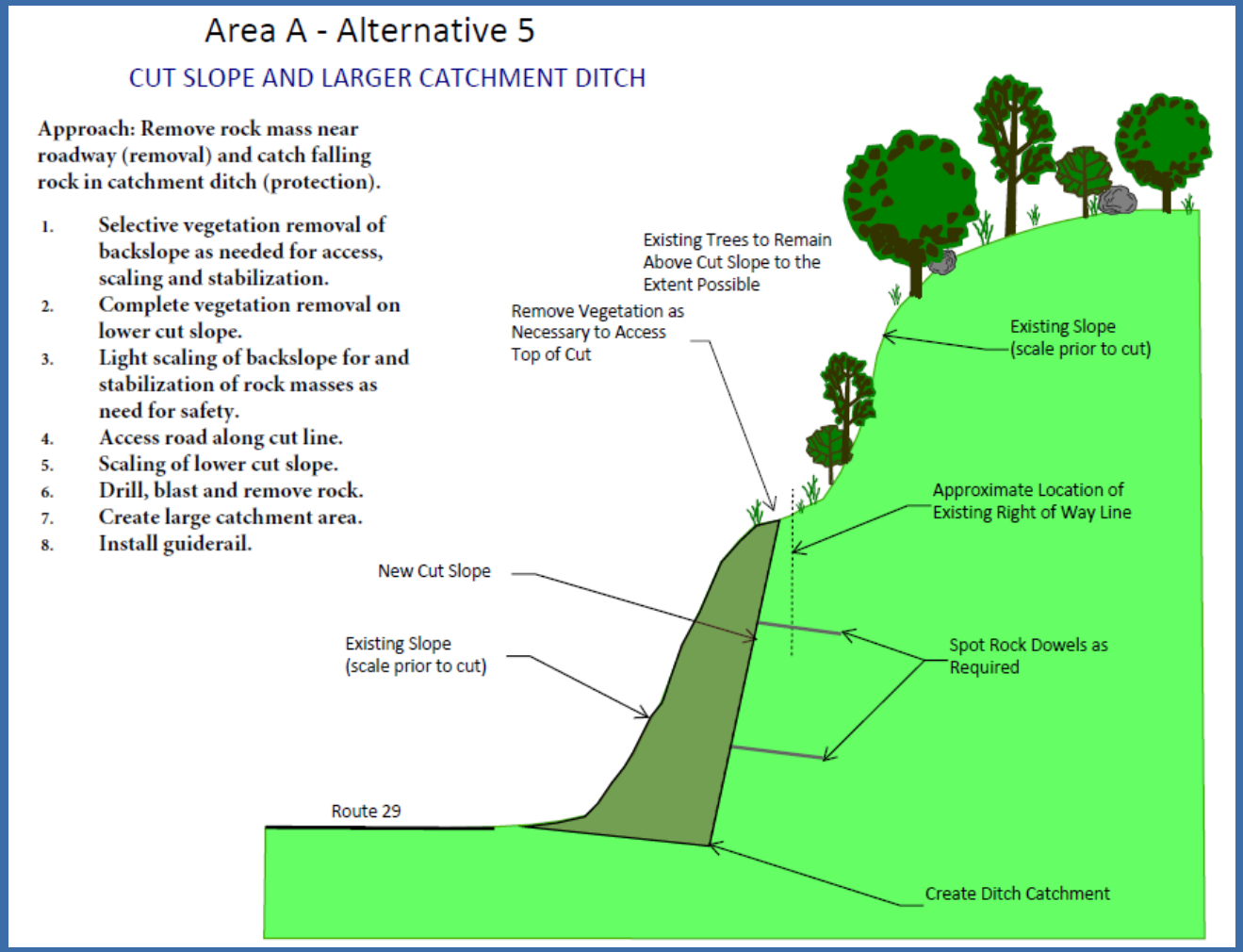
Alternative 4: Anchored mesh on existing rock face



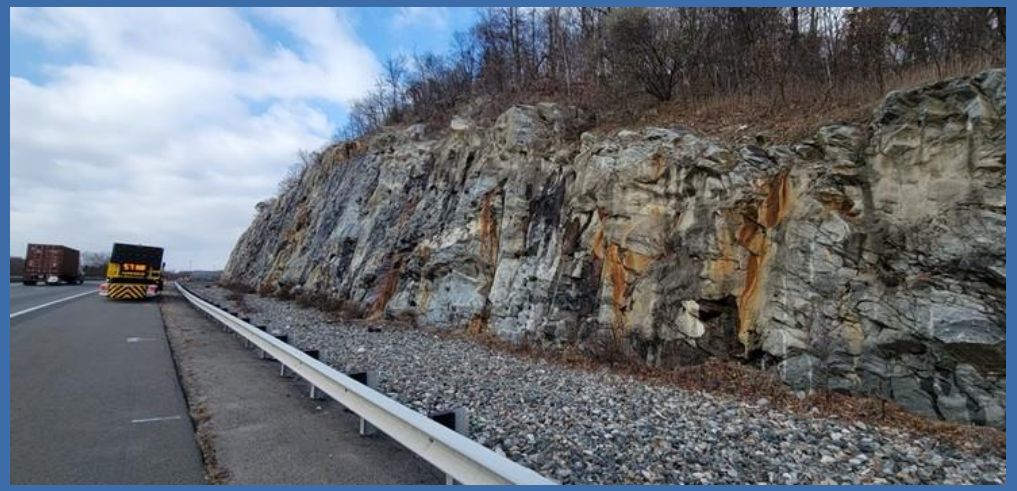
Alternative 4: Anchored Mesh on Existing Rock Face			
Safety		Safety (Adequate Risk Reduction)	
Community	Cultural Impacts	Archaeology	
		Historic Architecture	
		Recreation/Community Impacts	
Environmental	Permitting Requirements	Permit Complexity	
		Tree Reforestation	
		Threatened and Endangered Species Impacts	
		Aesthetic Impacts	
		Right-of-Way Impacts	
Construction		Impacts to Community and Traffic	
		Construction Safety and Risk	
Financial		Service Life	
		Maintenance Requirements	
		Capital Cost	

Example: Route 280 Westbound, West Orange

Alternative 5: Cut slope and large catchment ditch

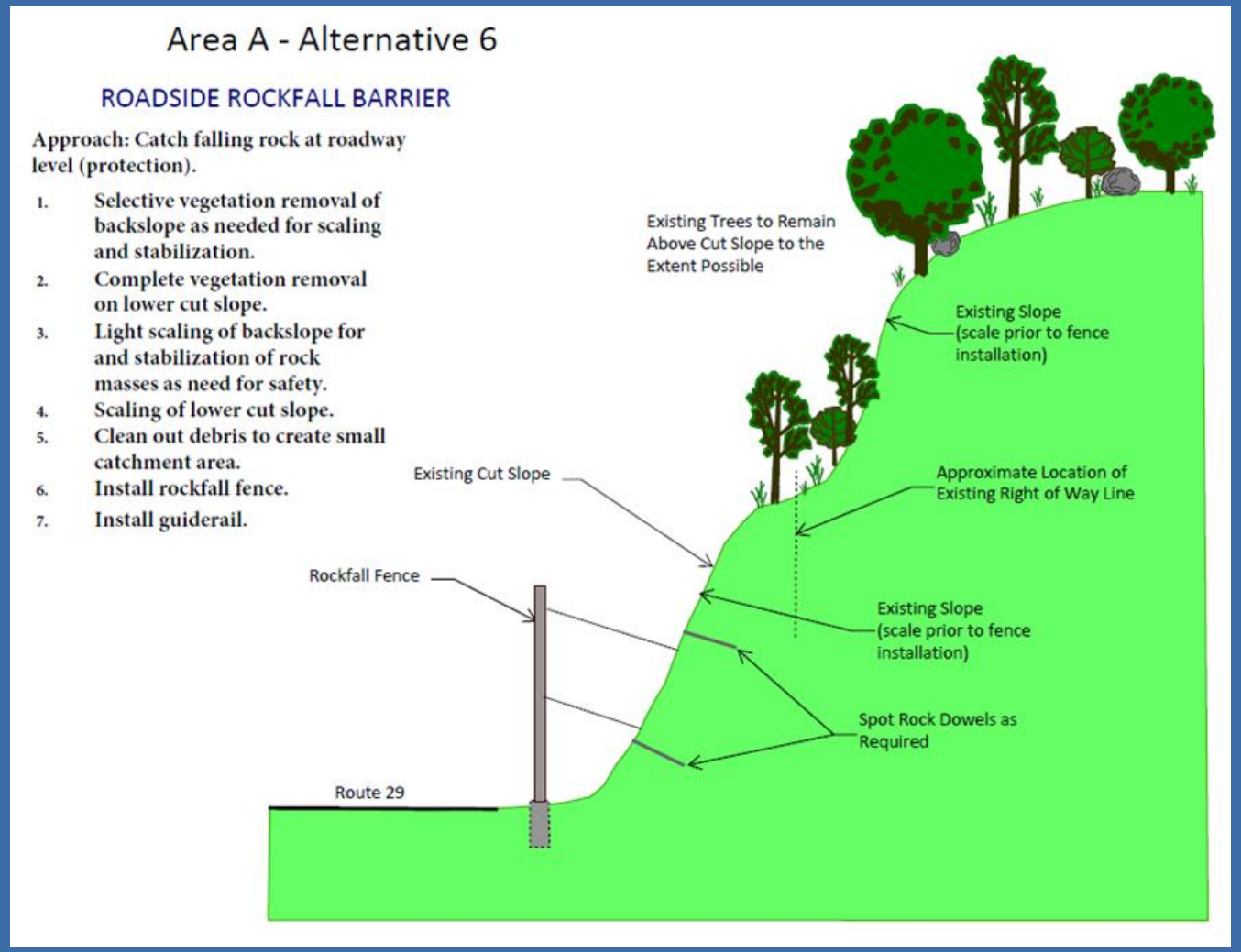


Alternative 5: Cut Slope and Larger Catchment Ditch			
Safety		Safety (Adequate Risk Reduction)	
Community	Cultural Impacts	Archaeology	
		Historic Architecture	
		Recreation/Community Impacts	
Environmental	Permitting Requirements	Permit Complexity	
		Tree Reforestation	
		Threatened and Endangered Species Impacts	
		Aesthetic Impacts	
		Right-of-Way Impacts	
Construction		Impacts to Community and Traffic	
		Construction Safety and Risk	
Financial		Service Life	
		Maintenance Requirements	
		Capital Cost	



Example: Route 80 Westbound, Roxbury

Alternative 6: Roadside rockfall barrier



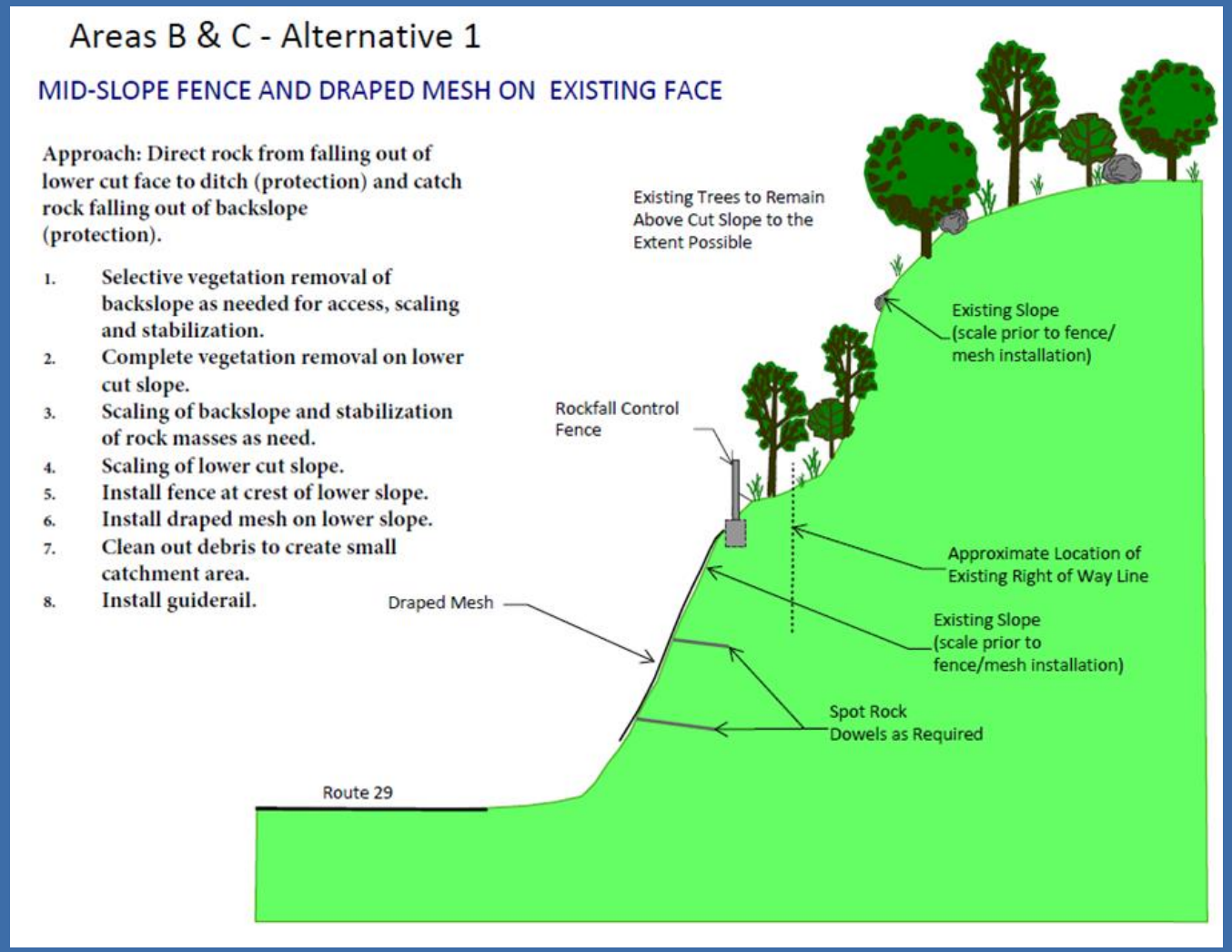
Alternative 6: Roadside Rockfall Barrier			
Safety		Safety (Adequate Risk Reduction)	
Community	Cultural Impacts	Archaeology	
		Historic Architecture	
		Recreation/Community Impacts	
Environmental	Permitting Requirements	Permit Complexity	
		Tree Reforestation	
		Threatened and Endangered Species Impacts	
		Aesthetic Impacts	
		Right-of-Way Impacts	
Construction		Impacts to Community and Traffic	
		Construction Safety and Risk	
Financial		Service Life	
		Maintenance Requirements	
		Capital Cost	

Example: Route 46 Westbound, Knowlton

Area A Alternatives Matrix

Note: For more details, please see the full Rating Criteria table			Viable Alternatives						Not Viable		
			1	2	3	4	5	6			
			Draped Mesh on existing rock	Hybrid Fence with Ditch	Shotcrete on existing rock face	Anchored Mesh on existing rock face	Cut slope and larger Catchment Ditch	Roadside rockfall Barrier	No Action	Regrade existing Ditch	Remove vegetation and Scale
Safety		Safety (Adequate Risk Reduction)	At least 95% rock retained	At least 95% rock retained	At least 95% rock retained	At least 95% rock retained	At least 95% rock retained	At least 95% rock retained	< 95% rock retained	< 95% rock retained	< 95% rock retained
Community	Cultural Impacts	Archaeology	No known sites in footprint	No known sites in footprint	No known sites in footprint	No known sites in footprint	No known sites in footprint	No known sites in footprint			
		Historic Architecture	Present / No effect	Present / No effect	Present / No effect	Present / No effect	Present / No effect	Present / No effect			
		Recreation/ Community Impacts	Temporary impacts	Temporary impacts	Temporary impacts	Temporary impacts	Temporary impacts	Temporary impacts			
Environmental	Permitting Requirements	Permit Complexity	NJDEP / USACE General Permits	NJDEP / USACE General Permits	NJDEP / USACE General Permits	NJDEP / USACE General Permits	NJDEP / USACE General Permits	NJDEP / USACE General Permits			
		Tree Reforestation	NNL / Offsite reforestation	NNL / Offsite reforestation	NNL / Offsite reforestation	NNL / Offsite reforestation	NNL / Offsite reforestation	< 0.50 acres; no NJDEP NNL			
		Threatened and Endangered Species Impacts	Direct Impact	Direct Impact	Direct Impact	Direct Impact	Direct Impact	Direct Impact			
		Aesthetic Impacts	Blending possible	Blending possible	Blending not possible	Blending possible	Select veg or rock removal	Blending possible			
		Right-of-Way Impacts	Temporary impacts	Temporary impacts	Temporary impacts	Temporary impacts	Temporary impacts	Temporary impacts			
Construction		Impacts to Community and Traffic	Short-term closure / detour	Short-term closure / detour	Short-term closure / detour	Short-term closure / detour	Short-term closure / detour	Long-term detour			
		Construction Safety and Risk	Standard construction	Standard construction	Standard construction	Standard construction	Complex construction	Simple construction			
Financial		Service Life	20-50 years	20-50 years	20-50 years	20-50 years	> 50 years	20-50 years			
		Maintenance Requirements	Regular debris cleanup	Specialized repair	Regular debris cleanup	Regular inspection	Regular inspection	Specialized repair			
		Capital Cost	Cost estimate being updated and will be presented at Meeting #3								

Alternative 1: Mid slope rockfall fence draped mesh on face



Alternative 1: Mid-Slope Fence and Draped Mesh on Existing Face			
Safety		Safety (Adequate Risk Reduction)	
Community	Cultural Impacts	Archaeology	
		Historic Architecture	
		Recreation/Community Impacts	
Environmental	Permitting Requirements	Permit Complexity	
		Tree Reforestation	
		Threatened and Endangered Species Impacts	
		Aesthetic Impacts	
		Right-of-Way Impacts	
Construction		Impacts to Community and Traffic	
		Construction Safety and Risk	
Financial		Service Life	
		Maintenance Requirements	
		Capital Cost	

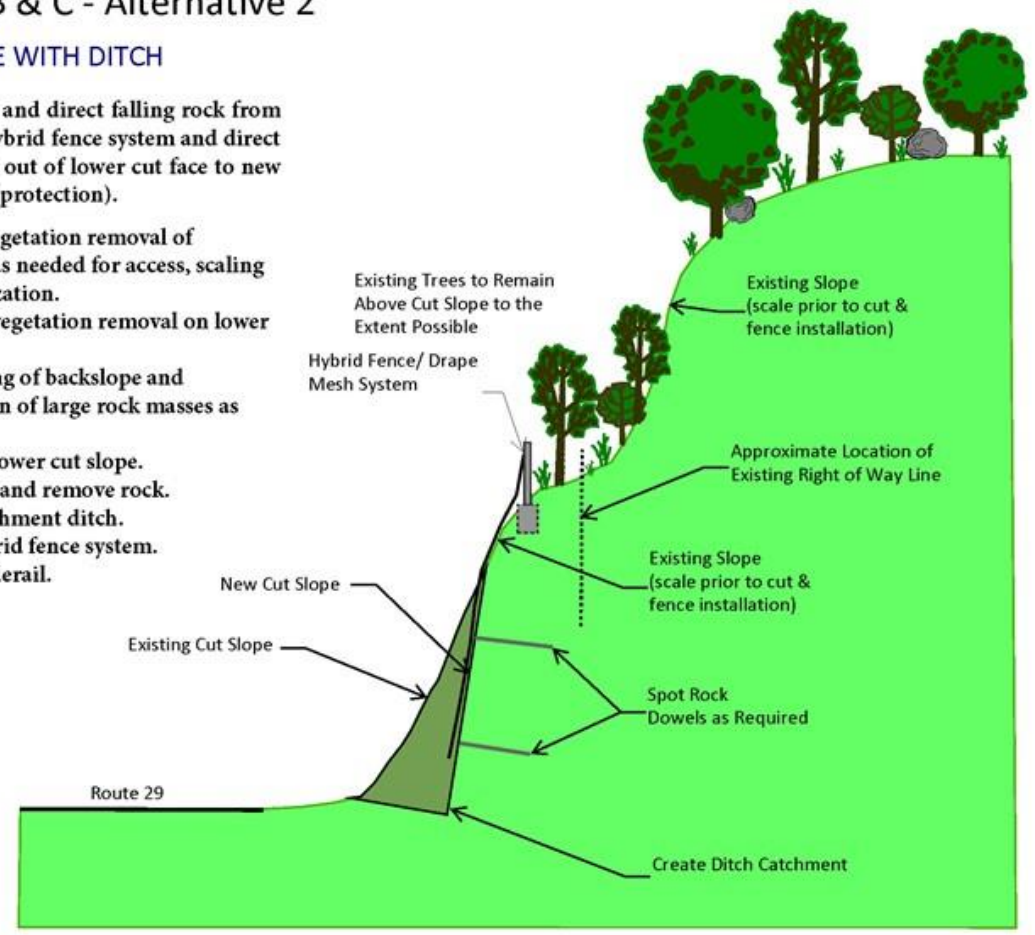
Alternative 2: Hybrid fence with ditch

Areas B & C - Alternative 2

HYBRID FENCE WITH DITCH

Approach: Catch and direct falling rock from backslope with hybrid fence system and direct rock from falling out of lower cut face to new catchment ditch (protection).

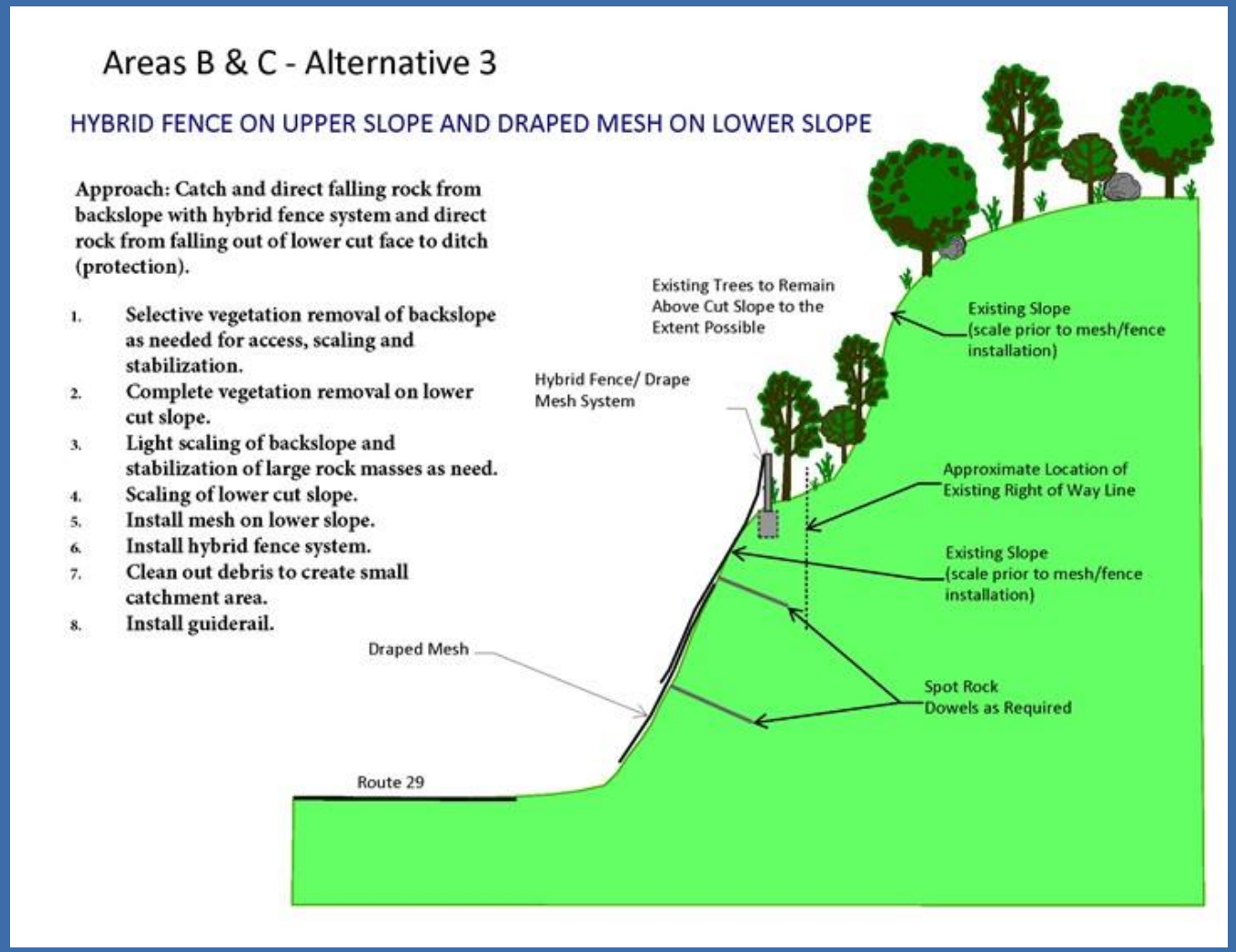
1. Selective vegetation removal of backslope as needed for access, scaling and stabilization.
2. Complete vegetation removal on lower cut slope.
3. Light scaling of backslope and stabilization of large rock masses as need.
4. Scaling of lower cut slope.
5. Drill, blast and remove rock.
6. Create catchment ditch.
7. Install hybrid fence system.
8. Install guiderail.



Alternative 2: Hybrid Fence with Ditch			
Safety		Safety (Adequate Risk Reduction)	
Community	Cultural Impacts	Archaeology	
		Historic Architecture	
		Recreation/Community Impacts	
Environmental	Permitting Requirements	Permit Complexity	
		Tree Reforestation	
		Threatened and Endangered Species Impacts	
		Aesthetic Impacts	
		Right-of-Way Impacts	
Construction		Impacts to Community and Traffic	
		Construction Safety and Risk	
Financial		Service Life	
		Maintenance Requirements	
		Capital Cost	

Example: Route 280 Eastbound, West Orange

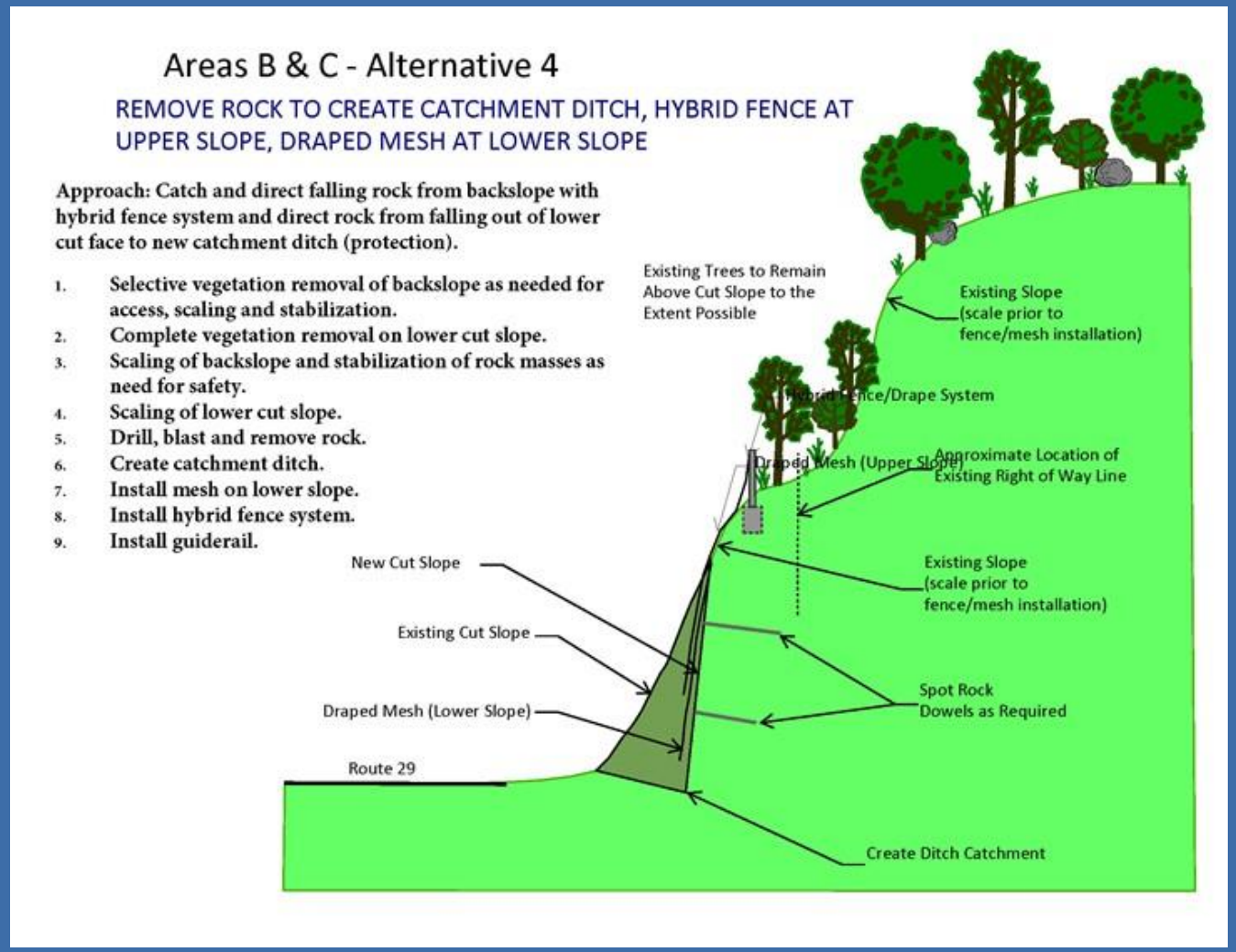
Alternative 3: Hybrid fence and draped mesh



Alternative 3: Hybrid Fence on Upper Slope and Draped Mesh on Lower Slope			
Safety		Safety (Adequate Risk Reduction)	
Community	Cultural Impacts	Archaeology	
		Historic Architecture	
		Recreation/Community Impacts	
Environmental	Permitting Requirements	Permit Complexity	
		Tree Reforestation	
		Threatened and Endangered Species Impacts	
		Aesthetic Impacts	
		Right-of-Way Impacts	
Construction		Impacts to Community and Traffic	
		Construction Safety and Risk	
Financial		Service Life	
		Maintenance Requirements	
		Capital Cost	

Example: Lehigh Water Gap, PA

Alternative 4: Hybrid fence, mesh and ditch



Alternative 4: Create Catchment Ditch, Hybrid Fence on Upper Slope and Draped Mesh on Lower Slope			
Safety		Safety (Adequate Risk Reduction)	
Community	Cultural Impacts	Archaeology	
		Historic Architecture	
		Recreation/Community Impacts	
Environmental	Permitting Requirements	Permit Complexity	
		Tree Reforestation	
		Threatened and Endangered Species Impacts	
		Aesthetic Impacts	
		Right-of-Way Impacts	
Construction		Impacts to Community and Traffic	
		Construction Safety and Risk	
Financial		Service Life	
		Maintenance Requirements	
		Capital Cost	

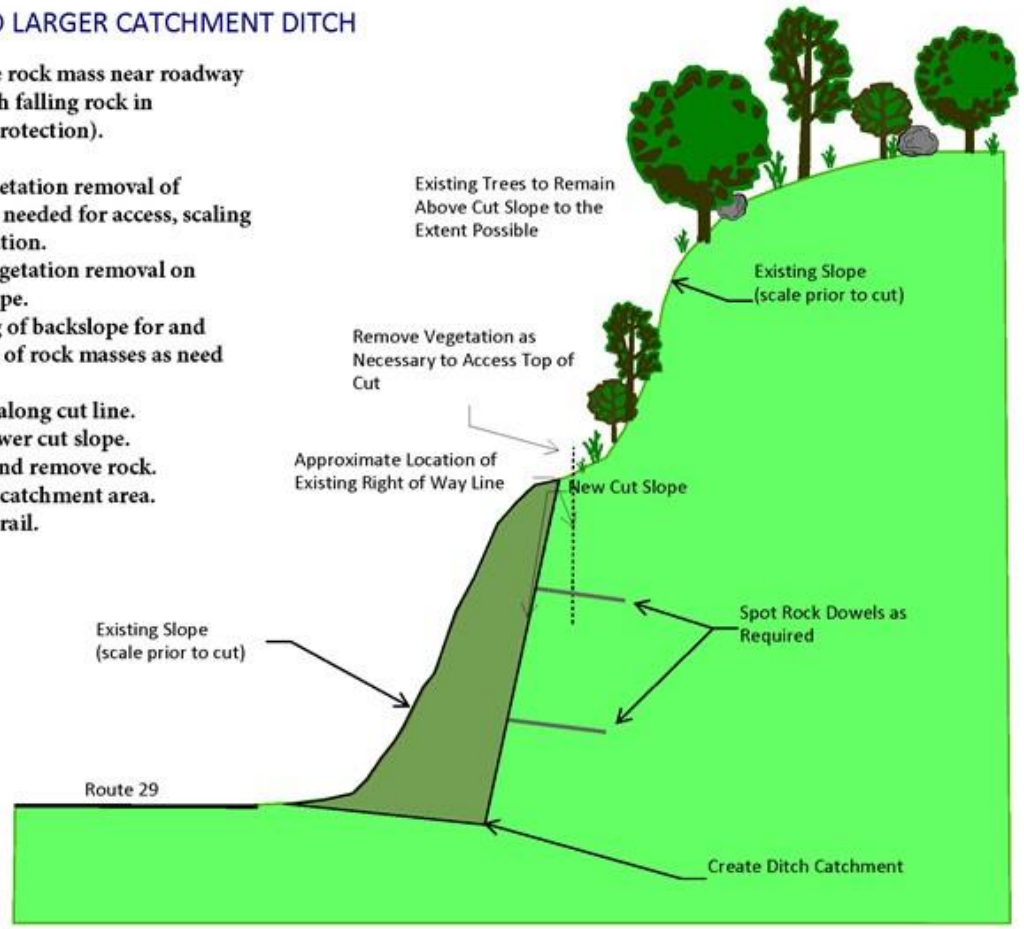
Alternative 5: Cut slope and large catchment ditch

Areas B & C - Alternative 5

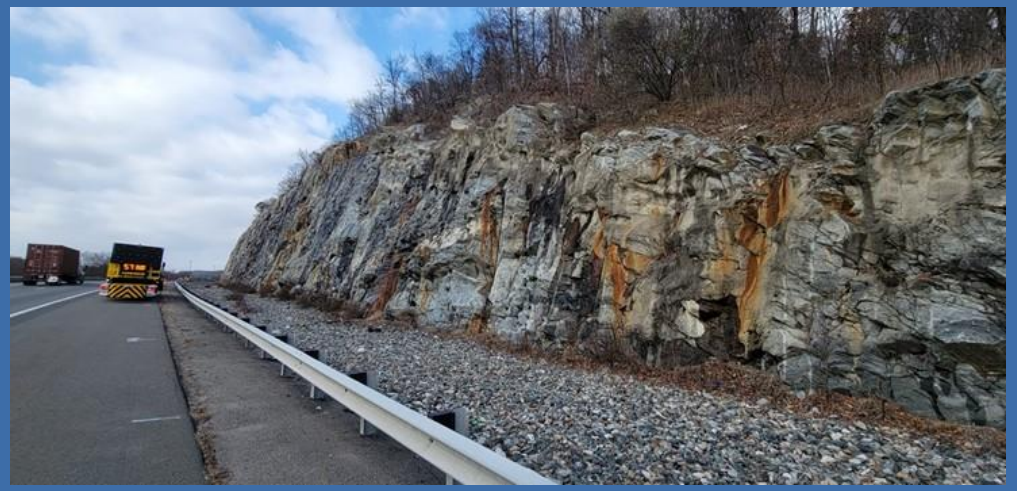
CUT SLOPE AND LARGER CATCHMENT DITCH

Approach: Remove rock mass near roadway (removal) and catch falling rock in catchment ditch (protection).

1. Selective vegetation removal of backslope as needed for access, scaling and stabilization.
2. Complete vegetation removal on lower cut slope.
3. Light scaling of backslope for and stabilization of rock masses as need for safety.
4. Access road along cut line.
5. Scaling of lower cut slope.
6. Drill, blast and remove rock.
7. Create large catchment area.
8. Install guiderail.

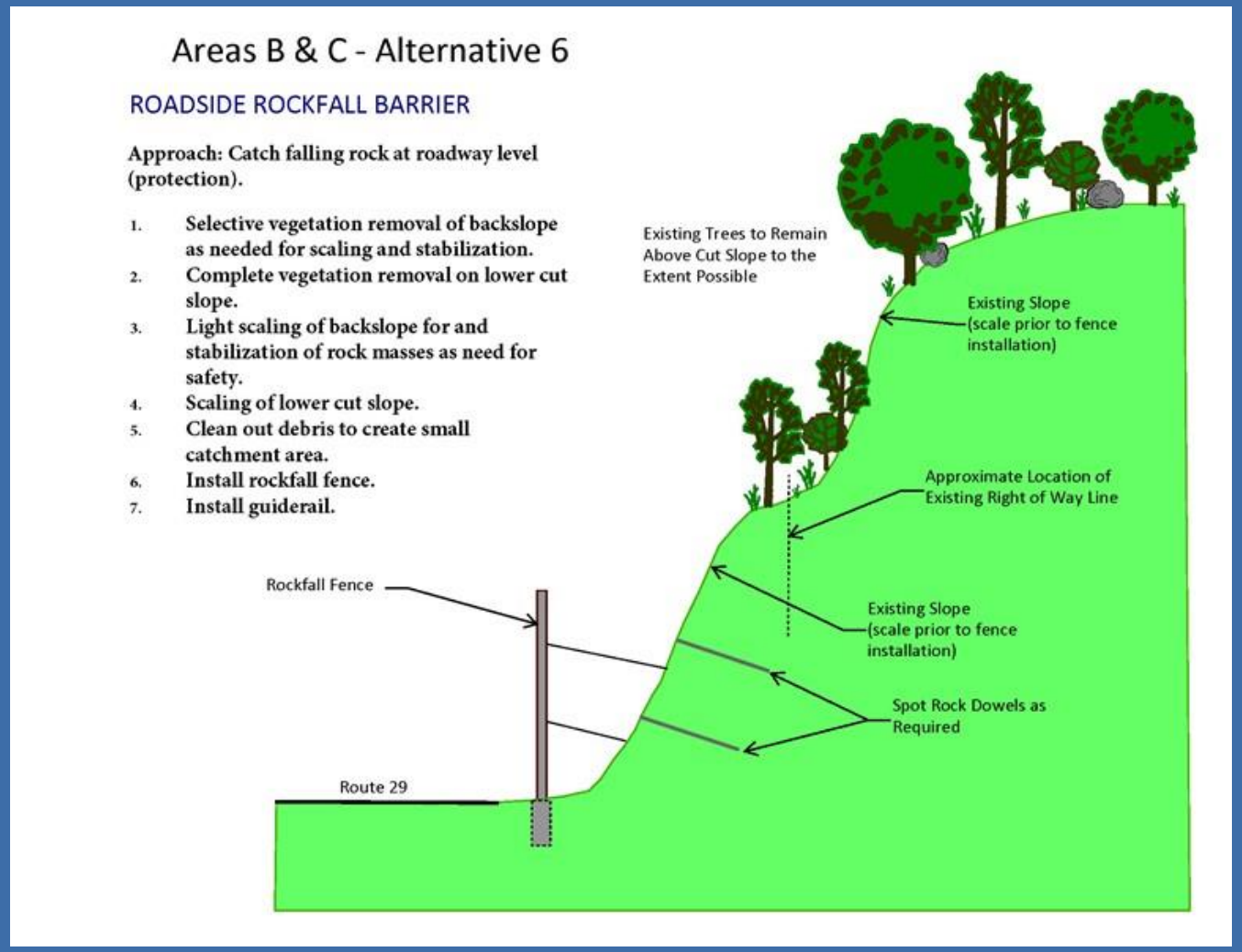


Alternative 5: Cut Slope and Larger Catchment Ditch			
Safety		Safety (Adequate Risk Reduction)	
Community	Cultural Impacts	Archaeology	
		Historic Architecture	
		Recreation/Community Impacts	
Environmental	Permitting Requirements	Permit Complexity	
		Tree Reforestation	
		Threatened and Endangered Species Impacts	
		Aesthetic Impacts	
		Right-of-Way Impacts	
Construction		Impacts to Community and Traffic	
		Construction Safety and Risk	
Financial		Service Life	
		Maintenance Requirements	
		Capital Cost	



Example: Route 80 Westbound, Roxbury

Alternative 6: Roadside rockfall barrier



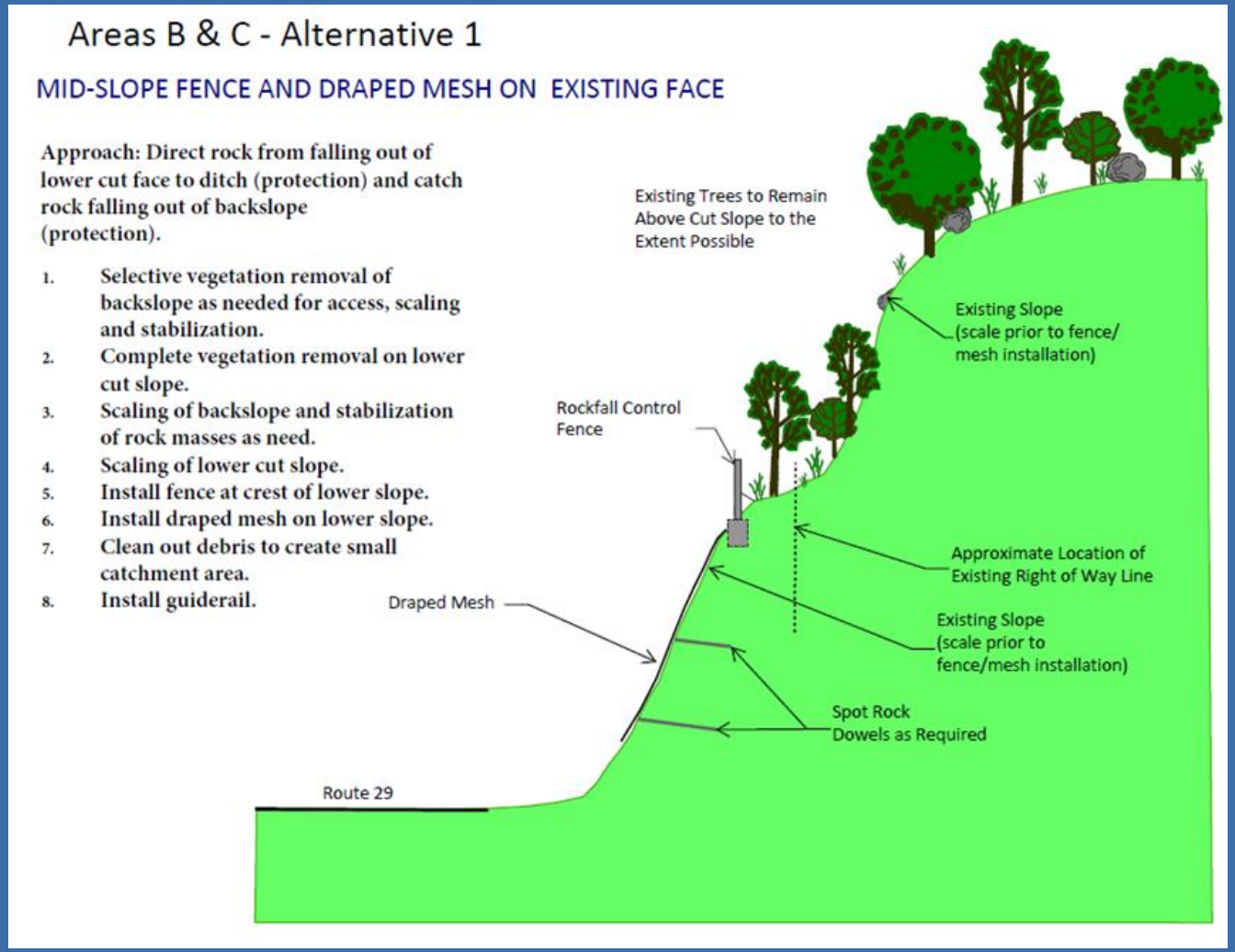
Alternative 6: Roadside Rockfall Barrier			
Safety		Safety (Adequate Risk Reduction)	
Community	Cultural Impacts	Archaeology	
		Historic Architecture	
		Recreation/Community Impacts	
Environmental	Permitting Requirements	Permit Complexity	
		Tree Reforestation	
		Threatened and Endangered Species Impacts	
		Aesthetic Impacts	
		Right-of-Way Impacts	
Construction		Impacts to Community and Traffic	
		Construction Safety and Risk	
Financial		Service Life	
		Maintenance Requirements	
		Capital Cost	

Example: Route 46 Westbound, Knowlton

Area B Alternatives Matrix

			Viable Alternatives						
Note: For more details, please see the full Rating Criteria table			1	2	3	4	5	6	Not Viable
			Mid-slope Fence and Draped Mesh on existing Face	Hybrid Fence with Ditch	Hybrid Fence on upper slope and Draped Mesh on lower slope	Create Catchment Ditch, Hybrid Fence on upper slope and Draped Mesh on lower slope	Cut slope and larger Catchment Ditch	Roadside rockfall Barrier	No Action
Safety		Safety (Adequate Risk Reduction)	At least 95% rock retained	At least 95% rock retained	At least 95% rock retained	At least 95% rock retained	At least 95% rock retained	At least 95% rock retained	< 95% rock retained
Community	Cultural Impacts	Archaeology	Known sites in footprint	Known sites in footprint	Known sites in footprint	Known sites in footprint	Known sites in footprint	Known sites in footprint	
		Historic Architecture	Present / No effect	Present / No effect	Present / No effect	Present / No effect	Present / No effect	Present / No effect	
		Recreation/Community Impacts	Temporary impacts	Temporary impacts	Temporary impacts	Temporary impacts	Temporary impacts	Temporary impacts	
Environmental	Permitting Requirements	Permit Complexity	NJDEP / USACE General Permits	NJDEP / USACE General Permits	NJDEP / USACE General Permits	NJDEP / USACE General Permits	NJDEP / USACE General Permits	NJDEP / USACE General Permits	
		Tree Reforestation	NNL / Offsite reforestation	NNL / Offsite reforestation	NNL / Offsite reforestation	NNL / Offsite reforestation	NNL / Offsite reforestation	< 0.50 acres; no NJDEP NNL	
		Threatened and Endangered Species Impacts	Direct Impact	Direct Impact	Direct Impact	Direct Impact	Direct Impact	Direct Impact	
		Aesthetic Impacts	Blending possible	Blending possible	Blending possible	Blending possible	Select veg or rock removal	Blending possible	
		Right-of-Way Impacts	Temporary impacts	Temporary impacts	Temporary impacts	Temporary impacts	Temporary impacts	Temporary impacts	
Construction		Impacts to Community and Traffic	Short-term closure / detour	Short-term closure / detour	Short-term closure / detour	Short-term closure / detour	Short-term closure / detour	Long-term detour	
		Construction Safety and Risk	Standard construction	Complex construction	Standard construction	Complex construction	Complex construction	Simple construction	
Financial		Service Life	20-50 years	20-50 years	20-50 years	20-50 years	> 50 years	20-50 years	
		Maintenance Requirements	Specialized repair	Specialized repair	Specialized repair	Specialized repair	Regular inspection	Specialized repair	
		Capital Cost	Cost estimate being updated and will be presented at Meeting #3						

Alternative 1: Mid slope rockfall fence draped mesh on face



Alternative 1: Mid-Slope Fence and Draped Mesh on Existing Face			
Safety		Safety (Adequate Risk Reduction)	
Community	Cultural Impacts	Archaeology	
		Historic Architecture	
		Recreation/Community Impacts	
Environmental	Permitting Requirements	Permit Complexity	
		Tree Reforestation	
		Threatened and Endangered Species Impacts	
		Aesthetic Impacts	
		Right-of-Way Impacts	
Construction		Impacts to Community and Traffic	
		Construction Safety and Risk	
Financial		Service Life	
		Maintenance Requirements	
		Capital Cost	

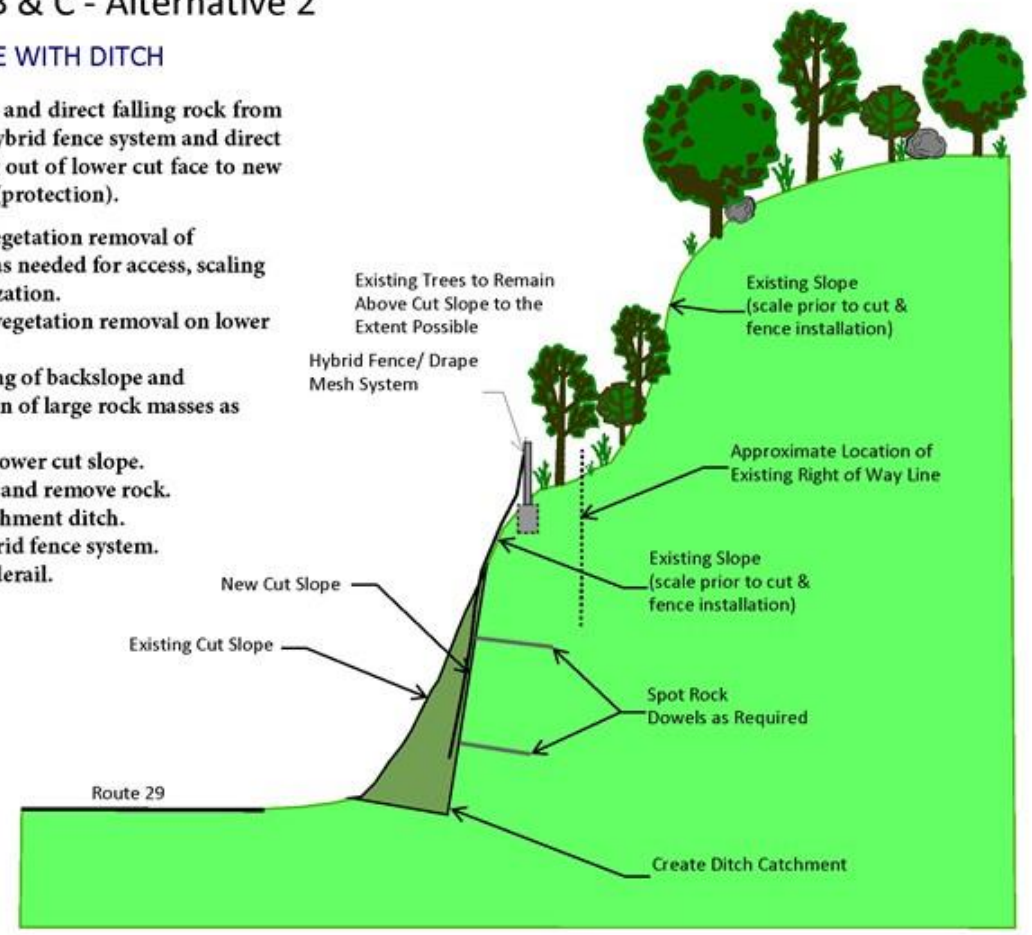
Alternative 2: Hybrid fence with ditch

Areas B & C - Alternative 2

HYBRID FENCE WITH DITCH

Approach: Catch and direct falling rock from backslope with hybrid fence system and direct rock from falling out of lower cut face to new catchment ditch (protection).

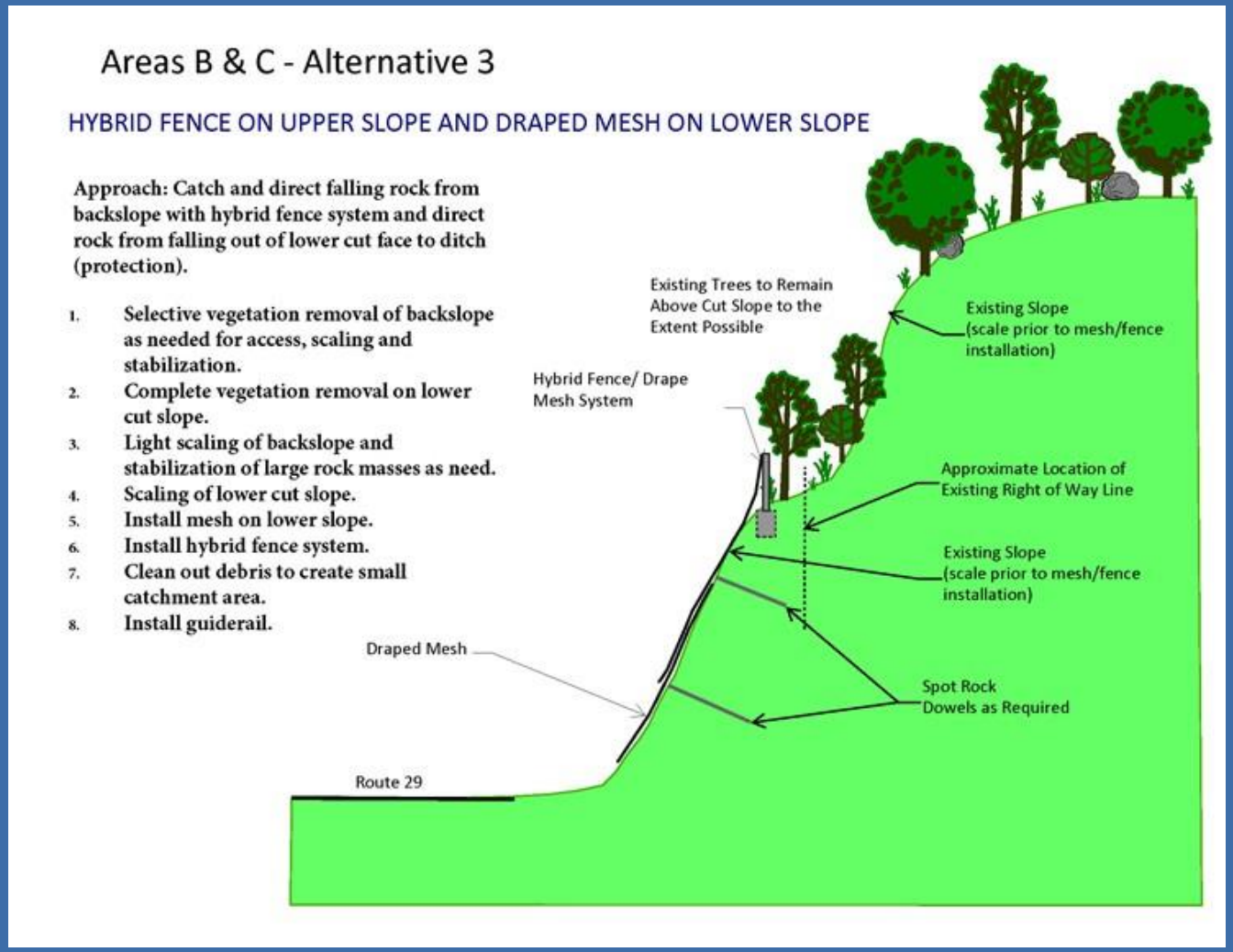
1. **Selective vegetation removal of backslope as needed for access, scaling and stabilization.**
2. **Complete vegetation removal on lower cut slope.**
3. **Light scaling of backslope and stabilization of large rock masses as need.**
4. **Scaling of lower cut slope.**
5. **Drill, blast and remove rock.**
6. **Create catchment ditch.**
7. **Install hybrid fence system.**
8. **Install guiderail.**



Alternative 2: Hybrid Fence with Ditch			
Safety		Safety (Adequate Risk Reduction)	
Community	Cultural Impacts	Archaeology	
		Historic Architecture	
		Recreation/Community Impacts	
Environmental	Permitting Requirements	Permit Complexity	
		Tree Reforestation	
		Threatened and Endangered Species Impacts	
		Aesthetic Impacts	
		Right-of-Way Impacts	
Construction		Impacts to Community and Traffic	
		Construction Safety and Risk	
Financial		Service Life	
		Maintenance Requirements	
		Capital Cost	

Example: Route 280 Eastbound, West Orange

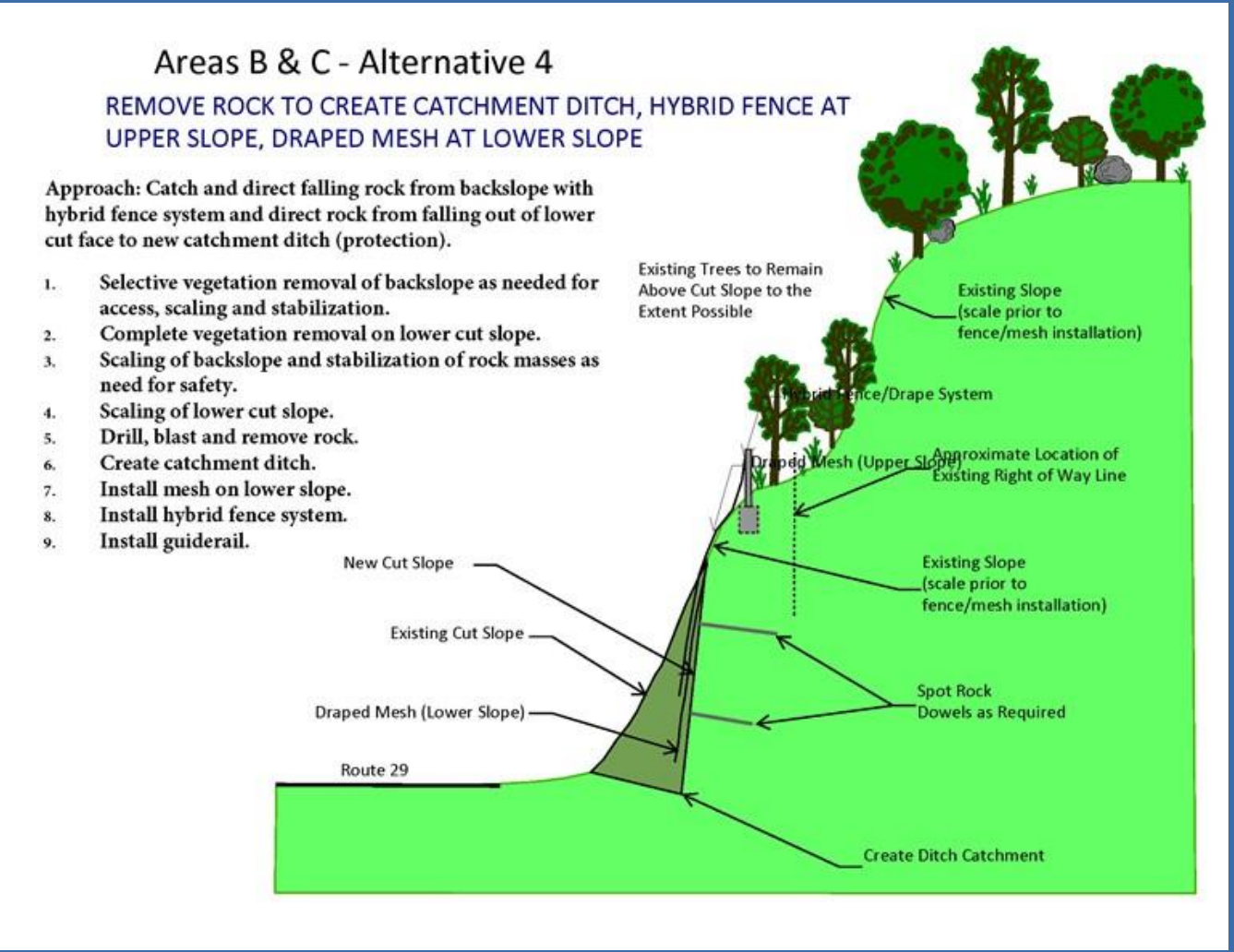
Alternative 3: Hybrid fence and draped mesh



Alternative 3: Hybrid Fence on Upper Slope and Draped Mesh on Lower Slope			
Safety		Safety (Adequate Risk Reduction)	
Community	Cultural Impacts	Archaeology	
		Historic Architecture	
		Recreation/Community Impacts	
Environmental	Permitting Requirements	Permit Complexity	
		Tree Reforestation	
		Threatened and Endangered Species Impacts	
		Aesthetic Impacts	
		Right-of-Way Impacts	
Construction		Impacts to Community and Traffic	
		Construction Safety and Risk	
Financial		Service Life	
		Maintenance Requirements	
		Capital Cost	

Example: Lehigh Water Gap, PA

Alternative 4: Hybrid fence, mesh and ditch



Alternative 4: Create Catchment Ditch, Hybrid Fence on Upper Slope and Draped Mesh on Lower Slope			
Safety		Safety (Adequate Risk Reduction)	
Community	Cultural Impacts	Archaeology	
		Historic Architecture	
		Recreation/Community Impacts	
Environmental	Permitting Requirements	Permit Complexity	
		Tree Reforestation	
		Threatened and Endangered Species Impacts	
		Aesthetic Impacts	
		Right-of-Way Impacts	
Construction		Impacts to Community and Traffic	
		Construction Safety and Risk	
Financial		Service Life	
		Maintenance Requirements	
		Capital Cost	

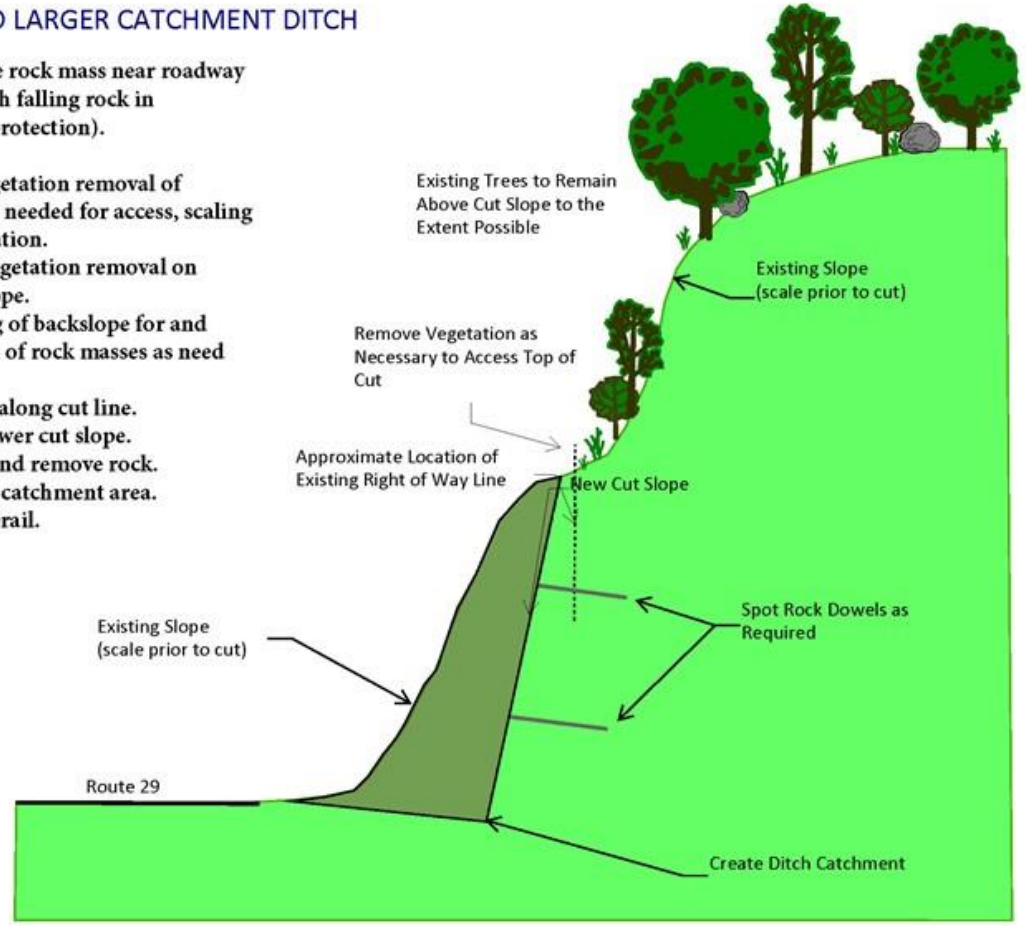
Alternative 5: Cut slope and large catchment ditch

Areas B & C - Alternative 5

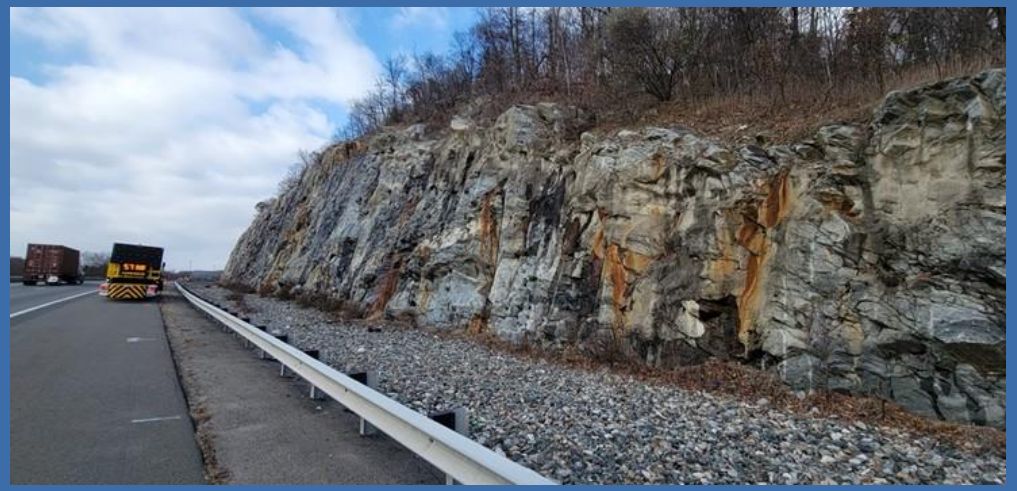
CUT SLOPE AND LARGER CATCHMENT DITCH

Approach: Remove rock mass near roadway (removal) and catch falling rock in catchment ditch (protection).

1. Selective vegetation removal of backslope as needed for access, scaling and stabilization.
2. Complete vegetation removal on lower cut slope.
3. Light scaling of backslope for and stabilization of rock masses as need for safety.
4. Access road along cut line.
5. Scaling of lower cut slope.
6. Drill, blast and remove rock.
7. Create large catchment area.
8. Install guiderail.

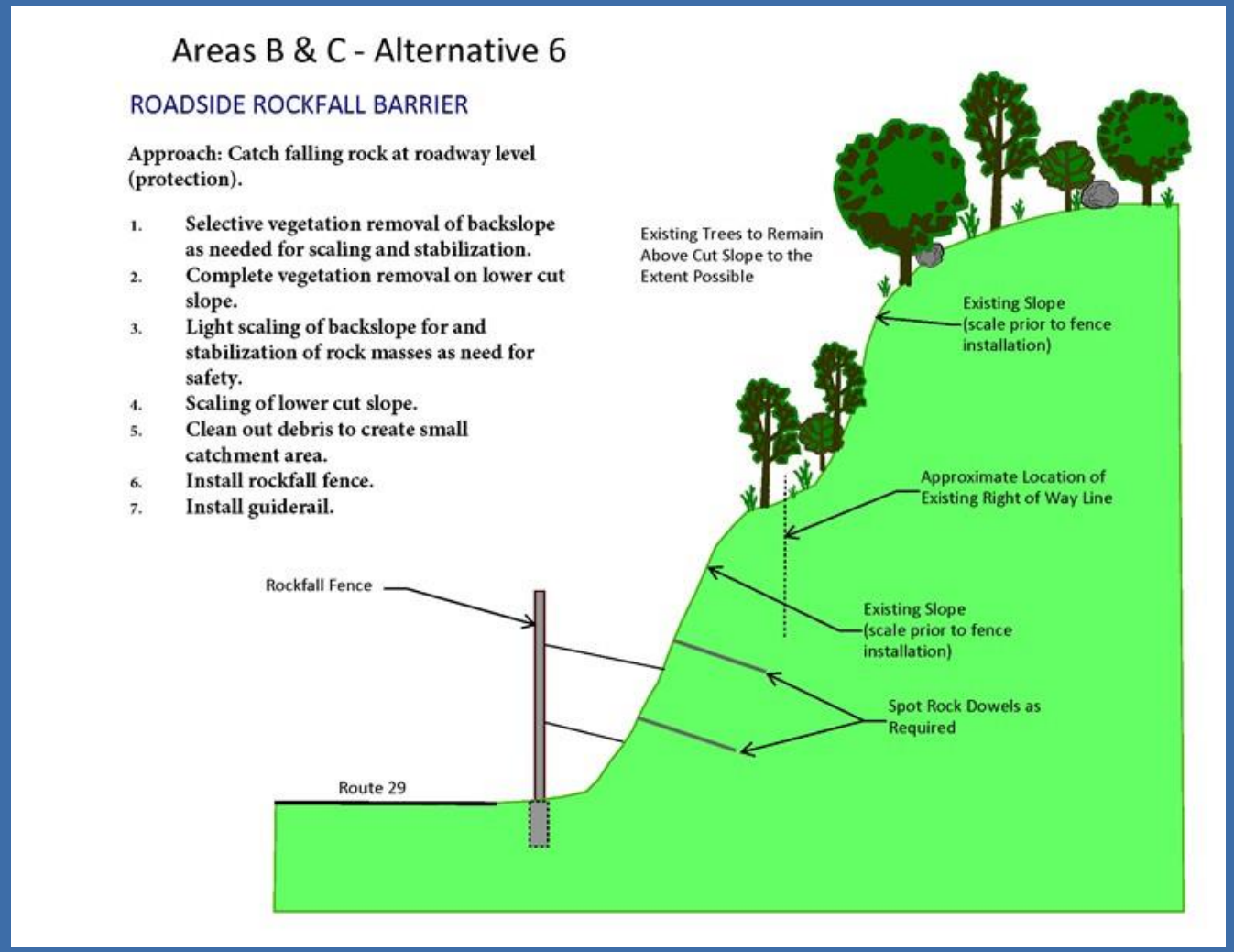


Alternative 5: Cut Slope and Larger Catchment Ditch			
Safety		Safety (Adequate Risk Reduction)	
Community	Cultural Impacts	Archaeology	
		Historic Architecture	
		Recreation/Community Impacts	
Environmental	Permitting Requirements	Permit Complexity	
		Tree Reforestation	
		Threatened and Endangered Species Impacts	
		Aesthetic Impacts	
		Right-of-Way Impacts	
Construction		Impacts to Community and Traffic	
		Construction Safety and Risk	
Financial		Service Life	
		Maintenance Requirements	
		Capital Cost	



Example: Route 80 Westbound, Roxbury

Alternative 6: Roadside rockfall barrier



Alternative 6: Roadside Rockfall Barrier			
Safety		Safety (Adequate Risk Reduction)	
Community	Cultural Impacts	Archaeology	
		Historic Architecture	
		Recreation/Community Impacts	
Environmental	Permitting Requirements	Permit Complexity	
		Tree Reforestation	
		Threatened and Endangered Species Impacts	
		Aesthetic Impacts	
		Right-of-Way Impacts	
Construction		Impacts to Community and Traffic	
		Construction Safety and Risk	
Financial		Service Life	
		Maintenance Requirements	
		Capital Cost	

Example: Route 46 Westbound, Knowlton

Area C Alternatives Matrix

Note: For more details, please see the full Rating Criteria table			Viable Alternatives						
			1	2	3	4	5	6	Not Viable
			Mid-slope Fence and Draped Mesh on existing Face	Hybrid Fence with Ditch	Hybrid Fence on upper slope and Draped Mesh on lower slope	Create Catchment Ditch, Hybrid Fence on upper slope and Draped Mesh on lower slope	Cut slope and larger Catchment Ditch	Roadside rockfall Barrier	No Action
Safety		Safety (Adequate Risk Reduction)	At least 95% rock retained	At least 95% rock retained	At least 95% rock retained	At least 95% rock retained	At least 95% rock retained	At least 95% rock retained	< 95% rock retained
Community	Cultural Impacts	Archaeology	No known sites in footprint	No known sites in footprint	No known sites in footprint	No known sites in footprint	No known sites in footprint	No known sites in footprint	
		Historic Architecture	Present / No effect	Present / No effect	Present / No effect	Present / No effect	Present / No effect	Present / No effect	
		Recreation/Community Impacts	Temporary impacts	Temporary impacts	Temporary impacts	Temporary impacts	Temporary impacts	Temporary impacts	
Environmental	Permitting Requirements	Permit Complexity	NJDEP / USACE Individual Permits	NJDEP / USACE Individual Permits	NJDEP / USACE Individual Permits	NJDEP / USACE Individual Permits	NJDEP / USACE Individual Permits	NJDEP / USACE General Permits	
		Tree Reforestation	NNL / Offsite reforestation	NNL / Offsite reforestation	NNL / Offsite reforestation	NNL / Offsite reforestation	NNL / Offsite reforestation	< 0.50 acres; no NJDEP NNL	
		Threatened and Endangered Species Impacts	Direct Impact	Direct Impact	Direct Impact	Direct Impact	Direct Impact	Direct Impact	
		Aesthetic Impacts	Blending possible	Blending possible	Blending possible	Blending possible	Select veg or rock removal	Blending possible	
		ROW Impacts	Temporary impacts	Temporary impacts	Temporary impacts	Temporary impacts	Temporary impacts	Temporary impacts	
Construction		Impacts to Community and Traffic	Short-term closure / detour	Short-term closure / detour	Short-term closure / detour	Short-term closure / detour	Short-term closure / detour	Long-term detour	
		Construction Safety and Risk	Standard construction	Complex construction	Standard construction	Complex construction	Complex construction	Simple construction	
Financial		Service Life	20-50 years	20-50 years	20-50 years	20-50 years	> 50 years	20-50 years	
		Maintenance Requirements	Specialized repair	Specialized repair	Specialized repair	Specialized repair	Regular inspection	Specialized repair	
		Capital Cost	Cost estimate being updated and will be presented at Meeting #3						