DoD Anti-Ram Vehicle Barriers



DEPARTMENT OF DEFENSE

US ARMY CORPS OF ENGINEERS PROTECTIVE DESIGN CENTER 1616 Capitol Avenue, Suite 9000 Omaha, Nebraska 68102-4901

DoD Anti-Ram Vehicle Barrier List

List Date: June 2025



The Department of Defense physical security concept is to create a layered or tiered defensive system that may include both active and passive perimeter barriers to delay, defeat or otherwise mitigate potential intruders. The Department employs several testing standards and testing procedures for both active vehicle barriers and passive vehicle barriers designated as "vehicle security barriers", "vehicle-impact rated barriers", or "anti-ram vehicle barriers". The testing standards include ASTM International F2656 and Department of State (DOS) SD STD-02.01, Specification for Vehicle Crash test of Perimeter Barriers and Gates.

The ASTM F2656-18 test standard rates barriers based on vehicle type, impact velocity and penetration. Barriers that were tested to ASTM F2656-07 and assigned a penetration rating of P4 are not included in the DOD Anti-Ram Vehicle Barriers List. The P4 penetration rating has been removed from ASTM F2656 in subsequent versions.

Barriers tested to DOS STD 02.01, ASTM F2656-07, ASTM F2656-15, ASTM F2656-18 and ASTM F2656-18a have penetration ratings based on measurement from the trailing edge of the barrier. Barriers tested to ASTM F2656-19 and all subsequent versions will have penetration ratings based on measurement from the leading edge of the impacted barrier element.

The following list of barriers includes active barriers for allowance or denial of vehicle access, and passive or fixed barriers to prevent circumvention of active vehicle barriers or for other perimeter applications. This list will be updated quarterly in January, April, July and October. A compliant report must be received one month prior to the list being published to be included on the next quarterly list.

Note: If the requirements of the test standard (ASTM, DOS) are not met and/or are not included in the test report, the tested product will not be added to this list and the report will be rejected for revision and resubmittal. The most common reason for rejection of submittals is a lack of comprehensive information about the test article (engineering drawings, dimensions, specifications, and material properties).

Note: This DOD Anti-Ram Vehicle Barrier List supersedes all previous versions. Please refer to the date above to ensure you have the most up to date list. Neither this list nor any previous list represents an overall endorsement of any product or design or addresses its operational suitability or maintainability. The list merely verifies that a particular vehicle barrier has been certified in accordance with the performance standards in ASTM F2656 or previously tested to the DOS SD-STD-02.01 standard and that the appropriate test reports have been submitted to, and validated by, the Protective Design Center. This list does not attempt to discern whether the barriers listed meet other contractual requirements. All listed barriers have been impact tested. Each vehicle barrier system has its own distinct characteristics that must be considered and weighed against the needs and conditions of the individual installation. Some barrier characteristics are associated with vulnerabilities. These vulnerabilities may not be readily apparent to the end users. See appendix A for a list of demonstrated characteristics. Careful consideration should be given to clearances and geometric characteristics when utilizing barrier systems of varying widths. For examples of ratings see appendix B. The PDC is available to discuss barrier characteristics, and other barrier issues or questions at PDC.Web@usace.army.mil.

Barrier Type: Pages: Active Bollard 3-5 Active Drop-Arm Beam 6-8 Active Gate 9-10 Active Net 11-12 Active Post and Beam 13 Active Wedge 14-19 Active Cable 20 **Passive Bollard** 21-31 **Passive Cable** 32-33 Passive Portable 34 Passive Post and Beam 35 Passive Fence 36 Passive Inertial 37 Appendix A 38-40 Appendix B 41-42

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	ACTIVE BOLLARD SEE NOTE 6 IN APPENDIX A				
Rating	Penetration	Barrier Model/Description	Manufacturer/Designer	Remarks	
К4	L2	SP Defender	ATG Access, Inc.	3-bollard array	
			http://www.atgaccessinc.com/		
K4	L2	DSC 800 Bollard Type Barricade	Delta Scientific Corporation	3-bollard array	
			http://deltascientific.com/	- 5	
M30	P1	Ground Retractable Bollard – Model	Barrier1 Systems, Inc.	Single Bollard	
		RB-400	http://www.barrier1.us/	6	
M30	P1	J355 HA-M30 (KH) Bollard	FAAC International, Inc.	Single bollard	
			http://www.faacusa.com/	6	
M30	P1	Movable Bollard M30	Perimeter Protection Germany GmbH	Single bollard	
			http://www.perimeterprotection.net/	5	
M30	P1	Movable Bollard, "AUIA – 348"	TiSO Production	Single bollard	
		-	<u>https://tiso.global/</u>	~	
M30	P1	RSS4003R	RSSI	3-bollard array	
			http://www.rssi.com/		
				Single bollard.	
				3.28' clear spacing would result from two adjacent as	
M30	P1	Model 303 Single High Impact	B&B Roadway and Security Solutions	tested bollards.	
		Operable Bollard		4' centerline spacing would result from two adjacent	
				as tested bollards.	
			<u>https://bbrss.com/</u>	48" wide foundation.	
		XT-1208-RB, Xact Series Retractable	Harden Architectural Security Products, LLC		
K8	L3	Bollards - (fka-Eagle Series Bollards,		3-bollard array, hydraulic bollards	
		K8)	https://www.hardensecure.com/		
K8	L2	DSC 701 Crash Certified Bollard	Delta Scientific Corporation	3-bollard array	
		Type Barricade	http://deltascientific.com/		
K8	L1	ARMR B-30 Bollard Assembly	B&B ARMR	3-bollard array, hydraulic bollards	
			http://www.bb-armr.com/		
				Single 10.63" bollard.	
				4.04' clear spacing would result from two adjacent as	
M40	P1	Hydraulic Bollard, HBD 275 H90	Ozak Access Technologies Inc.	tested bollards.	
				4.92' centerline spacing would result from two	
				adjacent as tested bollards.	
			https://ozak-t.com	59.1" wide foundation.	

ACTIVE BOLLARD SEE NOTE 6 IN APPENDIX A				
Rating	Penetration	Barrier Model/Description	Manufacturer/Designer	Remarks
K12	13	SD Titan	ATG Access, Inc	3 bollard array
K12	LJ	L5 SP IItali	http://www.atgaccessin0.com/	5-bonard array
V12	τ 2	Moyabla Pollard K12	Perimeter Protection Germany GmbH	Single Hydroulie bellerd
K12	L2	Wovable Bollard K12	http://www.perimeterprotection.net/	Single Hydraune Jonard
K12	12	NBI Hydraulic Bollard Barrier	Nasatka Barrier, Inc.	3-bollard array
K12	L2		http://www.nasatka.com/	5-00hard array
		XT-1208-RB, Xact Series Retractable	Harden Architectural Security Products II C	
K12	L2	Bollards - (fka-Eagle Series Bollards,	Harden Menneetaral Security Hoddets, ELC	3-bollard array, hydraulic bollards
		K12)	https://www.hardensecure.com/	
K12	T 1	B40 Retractable Bollard	B&B ARMR	3-bollard array, hydraulic bollards
IX12	L1		http://www.bb-armr.com/	5-bonard array, nyuraune bonards
M50	P1	SP1000 Rising Bollard	ATG Access, Inc	single hydraulic bollard
		ST 1000 Kising Donard	http://www.atgaccessin0.com/	single hydraule bohard
M50	P1	DSC720 1M	Delta Scientific Corporation	3-bollard array pneumatic bollards
			http://deltascientific.com/	5 contait antay, phoannaite contaitab
M50	P1	HT1 Raptor	Heald Ltd	Single bollard
			http://www.heald.uk.com/	Single contract
M50	P1	HRB-Protector Crash Tested Rising	Optima Engineering	Single bollard
		Bollard	http://www.optima-engineering.com/	Single contra
M50	P1	AUIA-342	TiSO Production	Single bollard
1110 0			<u>https://tiso.global/</u>	Single contaite
M50	Р2	TITAN MKII Hydraulic Bollard	ATG Access, Inc	3-bollard array hydraulic bollards
			http://www.atgaccessin0.com/	
		BLG-05 Foundations Protection	EL-GO TEAM Parking and Security Systems	
M50	P2	System		Single Pneumatic/Hydraulic/Electric Bollard
			http://www.elgoteam.com/	
M50	P2	Movable Bollard M50	Perimeter Protection Germany GmbH	Single Hydraulic bollard
			http://www.perimeterprotection.net/	
M50	Р2	PASS PM 275/M50-1200A	Pilomat SrI	Single Hydraulic bollard
1,100	1 -		http://www.pilomat.com	Single 11 di adite contata

	ACTIVE BOLLARD SEE NOTE 6 IN APPENDIX A				
Rating	Penetration	Barrier Model/Description	Manufacturer/Designer	Remarks	
M50	P2	G-1752 Active Bollard	Gibraltar Perimeter Security	Single 12" bollard. 4.67' clear spacing would result from two adjacent as tested bollards. 5.73' centerline spacing would result from two adjacent as tested bollards. 68.75" wide foundation.	
M50	P2	RollC Retractable Bollard	Rolle Company	Single 12.8" bollard. 6.81' clear spacing would result from two adjacent as tested bollards. 7.87' centerline spacing would result from two adjacent as tested bollards.	
			http://www.rollcksa.com/	94.5" wide foundation.	
M50	Р3	SW1700 (EM)	Global GRAB Technologies (fka: FutureNet Security Solutions, Smith & Wesson Security Solutions, Universal Safety Response)	3-bollard array, electromechanical	
			nttps://www.grabgiobai.com/		
M50	Р3	Hydraulic Tandem Bollard HBD 275 H 90	Ozak Access Technologies Inc.	 2-bollard array with 10.63" diameter bollards. 2.62' clear spacing would result from two adjacent as tested bollards within the 2-bollard array. 3.51' centerline spacing would result from two adjacent as tested bollards within the 2-bollard array. 4.04' clear spacing would result between two adjacent as tested 2-bollard arrays. 101.18" wide foundation. 	
C750	P2	Fixed bollard, RB343-68-GH-15- 0.1/0.1-032/100-140	TiSO Production https://tiso.global/	Single bollard	

RatingPowertationRemarksRemarksK4I.3Satyr-4 Crash BeamPerimeter Security Partners, LLC http://www.perimetersecurityPartners.com/11.5 foot clear openingK4I.3Bosik Bar VBS Shallow Foundation Barrier (SP VBB) K4ATG Access, Inc http://www.atpaccessinc.com/14 foot clear openingK4L3ARMR Model 730 Crash Gate DeploymentBEB ARMR http://www.atpaccessinc.com/12 foot clear opening, surface mounted http://www.atpaccessinc.com/K4L2IP500 Transportable Beam for Quick DeploymentDelta Scientific Corporation http://deltascientific.com/12 foot clear openingK4L2TT212EC Drop Arm Beam Barrier SystemDelta Scientific Comporation http://deltascientific.com/12 foot clear openingM30P1M530 12-foot Drop Arm AssemblyApex Fabrication & Design, Inc http://www.apexfab.com/26 foot clear openingM30P1Model 773 Series Drop Arm Barrier 909050102601-2FT M330Autogate, Inc http://www.apexfab.com/24 foot clear openingM30P1Sono Tube Barrier Arm http://www.tbrsc.com/L2 foot clear opening24 foot clear openingM30P1Sono Tube Barrier Arm http://www.tbrsc.com/11.5 foot clear openingM30P1Model DSC7090-M30RSSI Barriers http://delt.com/dict.crash.gate.html http://www.tbrsc.com/20 foot clear openingM30P1Model DSC7090-M30RSSI Barriers http://deltascientific Corporation http://deltascientific Corporation http://deltascientific.com/14 foot clear openingM3		ACTIVE DROP-ARM BEAM				
K4L3Satyr-4 Crash BeamPerimeter Security Partners, LC/ http://www.perimetersecuritypartners.com/11.5 foot clear openingK4L3Bosik Bar VBS Shallow Foundation Barrier (SP VBB) K4ATG Access, Inc http://www.atgaccessin.com/14 foot clear openingK4L3ARMR Model 730 Crash Gate Deploymenthttp://www.atgaccessin.com/12 foot clear openingK4L2'P500 Transportable Beam for Quick DeploymentDelta Scientific Corporation http://detascientific.com/12 foot clear openingK4L2TT212FC Drop Arm Beam Barrier SystemDelta Scientific Corporation http://detascientific.com/12 foot clear openingM30P1M530 12-foot Drop Arm Assembly 909050102601-26FT M530Apex Fabrication & Design, Inc. http://www.atgate.com/26 foot clear openingM30P1Model 773 Series Drop Arm Barrier 909050102601-26FT M530B&B Roadway Security Systems http://www.atgate.com/12 foot clear openingM30P1Stong Arm M30HyScurity Gate, Inc. http://www.stoscate.com/20 foot clear openingM30P1Stong Arm M30HyScurity Gate, Inc. http://www.tystems http://www.tystems20 foot clear openingM30P1RSS-3000 Drop Beam System Http://www.tymetal.com/11.5 foot clear openingM30P1Drop Arm Barrier Arm Http://www.stic.om/20 foot clear openingM30P1Stong Arm M30RESSI Barriers Http://www.tymetal.com/11.5 foot clear openingM30P1Drop Arm Barrier Arm Http://www.tymetal.com/12 foot cle	Rating	Penetration	Barrier Model/Description	Manufacturer/Designer	Remarks	
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M30P1Shallow Foundation Gate System 909050102601-26FT M530Apex Fabrication & Design, Inc. http://www.apexfab.com/26 foot clear openingM30P1M-30 VP-SFAutogate, Inc http://www.atogate.com/15 foot clear openingM30P1Model 773 Series Drop Arm BarrierB&B Roadway Security Systems http://www.bbrss.com/24 foot clear openingM30P1StrongArm M30HYSecurity Gate, Inc. http://www.bbrss.com/12 foot clear openingM30P1Sono Tube Barrier ArmLogical Decisions, Inc. http://dit.com/dit-crash-gate.html20 foot clear openingM30P1RSS-3000 Drop Beam SystemRSSI Barriers http://www.trsic.om/11.5 foot clear openingM30P1Drop Arm BarrierRSSI Barriers http://www.trsic.om/14 foot clear openingM30P1Model DSC7090-M30Delta Scientific Corporation http://deltascientific.com/12' (3.66m) clear openingM30P1M30 P1 Drop ArmBlack Security Products22.96' clear opening	10150	ΓI	MISSO 12-1001 Drop Arm Assembly	http://www.apexfab.com/	12 loot clear opening	
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M30P1M-30 VP-SFAutogate, Inc http://www.autogate.com/15 foot clear openingM30P1Model 773 Series Drop Arm BarrierB&B Roadway Security Systems https://www.bbrss.com/24 foot clear openingM30P1StrongArm M30HySecurity Gate, Inc. http://www.hysecurity.com/12 foot clear openingM30P1Sono Tube Barrier ArmLogical Decisions, Inc. http://di.com//di-crash-gate.html20 foot clear openingM30P1RSS-3000 Drop Beam SystemRSSI Barriers http://www.rssi.com/11.5 foot clear openingM30P1Drop Arm BarrierTymetal Corporation http://www.tymetal.com/14 foot clear openingM30P1Model DSC7090-M30Delta Scientific Corporation http://deltascientific.com/12' (3.66m) clear opening 4.02' (1.23m) clear spacing would result between two adjacent as tested barriers http://deltascientific.com/21.04' (6.41m) foundation widthM30P1M30 P1 Drop ArmBlack Security Products22.96' clear opening	M30	PI	909050102601-26FT M530	http://www.apexfab.com/	26 foot clear opening	
M30P1M-30 VP-SPhttp://www.autogate.com/13 foot clear openingM30P1Model 773 Series Drop Arm BarrierB&B Roadway Security Systems http://www.bbrss.com/24 foot clear openingM30P1StrongArm M30HySecurity Gate, Inc. http://www.hysecurity.com/12 foot clear openingM30P1Sono Tube Barrier ArmLogical Decisions, Inc. http://di.com/idi-crash-gate.html20 foot clear openingM30P1RSS-3000 Drop Beam SystemRSSI Barriers http://www.rssi.com/11.5 foot clear openingM30P1Drop Arm BarrierTymetal Corporation http://www.tymetal.com/14 foot clear openingM30P1Model DSC7090-M30Delta Scientific Corporation http://deltascientific.com/12.' (3.66m) clear opening adjacent as tested barriers adjacent as tested barriers http://deltascientific.com/12.' (3.200' (1.23m) clear opening adjacent as tested barriers adjacent as tested barriers http://deltascientific.com/20.' (1.23m) clear openingM30P1M30 P1 Drop ArmBlack Security Products22.96' clear opening	M20	D1	M 20 VD SE	Autogate, Inc	15 fact clean anoning	
M30P1Model 773 Series Drop Arm BarrierB&B Roadway Security Systems https://www.bbrss.com/24 foot clear openingM30P1StrongArm M30HySecurity Gate, Inc. http://www.hysecurity.com/12 foot clear openingM30P1Sono Tube Barrier ArmLogical Decisions, Inc. http://di.com/idi-crash-gate.html20 foot clear openingM30P1RSS-3000 Drop Beam SystemRSSI Barriers http://www.rssi.com/11.5 foot clear openingM30P1Drop Arm BarrierTymetal Corporation http://www.tymetal.com/14 foot clear openingM30P1Model DSC7090-M30Delta Scientific Corporation http://deltascientific.com/12' (3.66m) clear opening 4.02' (1.23m) clear spacing would result between two adjacent as tested barriers http://deltascientific.com/10.4' (6.41m) foundation widthM30P1M30 P1 Drop ArmBlack Security Products22.96' clear opening	M30	PI	M-30 VP-SF	http://www.autogate.com/	15 toot clear opening	
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M30P1StrongArm M30HySecurity Gate, Inc. http://www.hysecurity.com/12 foot clear openingM30P1Sono Tube Barrier ArmLogical Decisions, Inc. http://di.com/ldi-crash-gate.html20 foot clear openingM30P1RSS-3000 Drop Beam SystemRSSI Barriers http://www.rssi.com/11.5 foot clear openingM30P1Drop Arm BarrierTymetal Corporation http://www.tymetal.com/14 foot clear openingM30P1Model DSC7090-M30Delta Scientific Corporation http://deltascientific.com/4.02' (1.23m) clear spacing would result between two adjacent as tested barriers http://deltascientific.com/M30P1M30 P1 Drop ArmBlack Security Products22.96' clear opening	M30	PI	Model //3 Series Drop Arm Barrier	https://www.bbrss.com/	24 foot clear opening	
M30P1StrongArm M30http://www.hysecurity.com/12 foot clear openingM30P1Sono Tube Barrier ArmLogical Decisions, Inc. http://ldi.com/ldi-crash-gate.html20 foot clear openingM30P1RSS-3000 Drop Beam SystemRSSI Barriers http://www.rssi.com/11.5 foot clear openingM30P1Drop Arm BarrierTymetal Corporation http://www.tymetal.com/14 foot clear openingM30P1Drop Arm BarrierTymetal Corporation http://www.tymetal.com/12' (3.66m) clear openingM30P1Model DSC7090-M30Delta Scientific Corporation http://deltascientific.com/4.02' (1.23m) clear spacing would result between two adjacent as tested barriers http://deltascientific.com/21.04' (6.41m) foundation widthM30P1M30 P1 Drop ArmBlack Security Products22.96' clear opening	1420	D1	Sture of A M20	HySecurity Gate, Inc.	12 5 - + -1	
M30P1Sono Tube Barrier ArmLogical Decisions, Inc. http://di.com/ldi-crash-gate.html20 foot clear openingM30P1RSS-3000 Drop Beam SystemRSSI Barriers http://www.rssi.com/11.5 foot clear openingM30P1Drop Arm BarrierTymetal Corporation http://www.tymetal.com/14 foot clear openingM30P1Model DSC7090-M30Delta Scientific Corporation http://deltascientific.com/12' (3.66m) clear opening 4.02' (1.23m) clear spacing would result between two adjacent as tested barriers http://deltascientific.com/M30P1M30 P1 Drop ArmBlack Security Products22.96' clear opening	M30	PI	StrongArm M30	http://www.hysecurity.com/	12 foot clear opening	
M30P1Sono Tube Barrier Arm http://di.com/ldi-crash-gate.html20 foot clear openingM30P1RSS-3000 Drop Beam SystemRSSI Barriers http://www.rssi.com/11.5 foot clear openingM30P1Drop Arm BarrierTymetal Corporation http://www.tymetal.com/14 foot clear openingM30P1Model DSC7090-M30Delta Scientific Corporation http://deltascientific.com/4.02' (1.23m) clear spacing would result between two adjacent as tested barriers http://deltascientific.com/M30P1M30 P1 Drop ArmBlack Security Products22.96' clear opening	1420	D1		Logical Decisions, Inc.	20.6 / 1	
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M30P1RSS-3000 Drop Beam Systemhttp://www.rssi.com/11.5 foot clear openingM30P1Drop Arm BarrierTymetal Corporation http://www.tymetal.com/14 foot clear openingM30P1Model DSC7090-M30Delta Scientific Corporation 4.02' (1.23m) clear spacing would result between two adjacent as tested barriers http://deltascientific.com/12' (3.66m) clear openingM30P1Model DSC7090-M30Delta Scientific Corporation http://deltascientific.com/4.02' (1.23m) clear spacing would result between two adjacent as tested barriers 21.04' (6.41m) foundation widthM30P1M30 P1 Drop ArmBlack Security Products22.96' clear opening	100	D1		RSSI Barriers		
M30P1Drop Arm BarrierTymetal Corporation http://www.tymetal.com/14 foot clear openingM30P1Model DSC7090-M30Delta Scientific Corporation Delta Scientific.com/4.02' (1.23m) clear spacing would result between two adjacent as tested barriers 21.04' (6.41m) foundation widthM30P1M30 P1 Drop ArmBlack Security Products22.96' clear opening	M30	PI	RSS-3000 Drop Beam System	http://www.rssi.com/	11.5 foot clear opening	
M30P1Drop Arm Barrierhttp://www.tymetal.com/14 foot clear openingM30P1Model DSC7090-M30Delta Scientific Corporation4.02' (1.23m) clear spacing would result between two adjacent as tested barriers 21.04' (6.41m) foundation widthM30P1M30 P1 Drop ArmBlack Security Products22.96' clear opening	1420	D 1	, , , , , , , , , , , , , , , , , , ,	Tymetal Corporation	14.0 4 1	
M30P1Model DSC7090-M30Delta Scientific Corporation12' (3.66m) clear opening 4.02' (1.23m) clear spacing would result between two adjacent as tested barriers 21.04' (6.41m) foundation widthM30P1M30 P1 Drop ArmBlack Security Products22.96' clear opening	M30	PI	Drop Arm Barrier	http://www.tymetal.com/	14 foot clear opening	
M30 P1 Model DSC7090-M30 Delta Scientific Corporation 4.02' (1.23m) clear spacing would result between two adjacent as tested barriers M30 P1 M30 P1 Drop Arm Black Security Products 22.96' clear opening					12' (3.66m) clear opening	
M30 P1 Model DSC/090-M30 adjacent as tested barriers http://deltascientific.com/ 21.04' (6.41m) foundation width M30 P1 M30 P1 Drop Arm Black Security Products 22.96' clear opening	M20	D1	M- 1-1 DSC7000 M20	Delta Scientific Corporation	4.02' (1.23m) clear spacing would result between two	
M30P1M30 P1 Drop ArmBlack Security Products22.96' clear opening	M30	PI	Model DSC/090-M30		adjacent as tested barriers	
M30 P1 M30 P1 Drop Arm Black Security Products 22.96' clear opening				http://deltascientific.com/	21.04' (6.41m) foundation width	
MISU PI MISU PI Drop Arm Black Security Products 22.96' clear opening	N/20	D1	M20 D1 D A	Dia ale Sa asseriter Dea durate	22.0(1-1	
	M30	P1	M30 P1 Drop Arm	Black Security Products	22.96° clear opening	

ACTIVE DROP-ARM BEAM				
Rating	Penetration	Barrier Model/Description	Manufacturer/Designer	Remarks
M20	D1	12' Dron Arm	Ameristar Perimeter Security Systems	12 foot clear opening. Interpolation with 24' Drop
W150	1130 11	12 Drop Arm	http://ameristarsecurity.com/	Arm allowed with a P2 rating
1420	רת	241 Data A and	Ameristar Perimeter Security Systems	24 foot clear opening, Interpolation with 12' Drop
M30	P2	24 [°] Drop Arm	http://ameristarsecurity.com/	Arm allowed with a P2 rating.
1420	ЪЭ	N 11772 D A	B&B ARMR	
M30	P2	Model //3 Drop Arm	http://www.bb-armr.com/	24 foot clear opening
1420	т <u>э</u>	G-2300S Surface Mount Vehicle	Gibralter Cable Barrier Systems, L.P.	12 f t. 1
M30	P2	Barrier	http://www.gibraltarmaterials.com/	12 loot clear opening
1420	DO		Logical Decisions, Inc.	1056 (1)
M30	P2	Barrier Arm Crash Gate	http://ldi.com/ldi-crash-gate.html	Approx 12.5 foot clear opening
1420	ЪЭ	2410	Ameristar Perimeter Security Systems	24.6 / 1
M30	P2	24 [°] Drop Arm	http://ameristarsecurity.com/	24 foot clear opening
1420	ת	C 2200D D	Gibralter Cable Barrier Systems, L.P.	12 f t l
M30	P3	G-2300P Portable Venicle Barrier	http://www.gibraltarmaterials.com/	12 foot clear opening
1420	т <i>э</i>	C 4022D D + +-11- D A	Gibralter Cable Barrier Systems, L.P.	12 f t l
M30	M30 P3	G-4033P Portable Drop Arm	http://www.gibraltarmaterials.com/	12 loot clear opening
VO	т 2	VDL CD 24	Autogate, Inc	14.5 fact clear anoning
Кð	L3	VPL-CB-24	http://www.autogate.com/	14.5 toot clear opening
V10	т 2	Bosik Bar VBS Deep Foundation	ATG Access, Inc	14.25 foot along anoning
K12	LS	Barrier (SP VBB) K12	http://www.atgaccessinc.com/	14.23 loot clear opening
V12	т 2	VDL CD 24	Autogate, Inc	14.5 foot aloon apoping
K12	LS	VPL-CB-24	https://www.autogate.com/	14.5 foot clear opening
V12	т 2	DSC 7000 Domion	Delta Scientific Corporation	12 fact clear anoning
K12	LJ	DSC 7000 Barrier	https://deltascientific.com	12 loot clear opening
V12	τ2	NMSP XII Crash Boom Parrier 12 ft	Nasatka Barrier, Inc	12 foot clear opening
K12	LS	NMSD All Clash Beall Baller - 12 It	https://www.nasatka.com/	12 loot clear opening
V12	т 2	NMSP VII Creath Boom Dominian 18 ft	Nasatka Barrier, Inc	18 fact aloon anoning
K12	LS	NMSD All Clash Beall Barrier - 18 h	https://www.nasatka.com/	18 loot clear opening
M50	D1	TCDD12 Divist Arm/Doom	Tymetal Corporation	14 foot aloon anoning
1130	ГІ	TCRB12 FIVOt AIII/ Dealii	http://www.tymetal.com/	14 loot clear opening
M50	D1	Satur-12 Crash Ream	Perimeter Security Partners, LLC	12.9 foot clear opening
10130	1, 1	Satyi-12 Clash Dean	http://www.perimetersecuritypartners.com/	
M50	DЭ	21-ft Patriot Rising Been Barrier	Ameristar Perimeter Security Systems	24 foot clear opening
10130	M50 P2	2 24-ft Patriot Rising Beam Barrier	http://ameristarsecurity.com/	24 Ioot clear opening

			ACTIVE DROP-ARM BEAM	
Rating	Penetration	Barrier Model/Description	Manufacturer/Designer	Remarks
M50	Р2	Horizontal Crash Beam or Horizontal Cable Barrier (HCB) Ground	Barrier1 Systems, Inc	15'-10" span - interpolation with 40'-10" span barrier is acceptable
		Retractable Active Vehicle Barrier	Barrier1 Systems, Inc	1
M50	Р2	Horizontal Crash Beam or Horizontal Cable Barrier (HCB) Ground	Barrier1 Systems, Inc	47'-10" foot net width - interpolation with 15'-10"
11120	12	Retractable Active Vehicle Barrier	http://www.barrier1.us/	barrier is acceptable
M50	0	Drop Arm Crash Beam Model FCB-	Barrier1 Systems, Inc	12' 0" alaon anoning
W130	FZ	1200	http://www.barrier1.us/	15 -9 clear opening
M50	רת	P2 StrongArm M50	HySecurity Gate, Inc.	12 foot allow a series
W130	P2		http://www.hysecurity.com/	12 foot clear opening
M50	רת	24' Drog Arm	Black Security Products	24.0' (7.315 m) Clear Opening 29.58' - (9.016 m)
W130	P2	rz 24 Diop Alli	http://www.blacksp.com/	Foundation Width
M50	D٦	P2 Satyr-12 Crash Beam	Perimeter Security Partners, LLC	28 foot clear opening
10130	1 2		http://www.perimetersecuritypartners.com/	28 loot clear opening
M50	P3	Dron Arm Vehicle Barrier - KBVB	Barrier1 Systems, Inc.	14 foot clear opening, interpolation with 34 foot
11150	15		http://www.barrier1.us/	width acceptable
		Active Drop Arm Swing Gate,		
M50	P3	Surface Set Mobile Crash Beam	Barrier1 Systems, Inc	14 foot clear opening, interpolation with 34 foot
11150	Barrier, 14'0" Span, Model	Barrier, 14'0" Span, Model		width acceptable
		#DASG-SSM	Barrier1 Systems, Inc	
		Active Drop Arm Swing Gate,		
M50	P3	Surface Set Mobile Crash Beam	Barrier1 Systems, Inc	34 foot clear opening, interpolation with 14 foot
11130	15	Barrier, 34'0" Span, Model		width acceptable
		#DASG-SSM	Barrier1 Systems, Inc	

	ACTIVE GATE				
Rating	Penetration	Barrier Model/Description	Manufacturer/Designer	Remarks	
K4	1.2	ARMR Model 400 Sliding Gate	B&B ARMR	12 foot clear opening	
			http://www.bb-armr.com/		
M30	P1	K4 Shield Crash Gate	Autogate, Inc	15'-8" clear opening	
			http://www.autogate.com		
			Heavy Duty Gate, Inc. (fka: Morrison		
M30	P1	AR-266 - 12 ft	Equipment)	12 foot clear opening	
			http://www.barrier1.us/		
M30	D 1	TCG4 Sliding Gate Barrier	Tymetal Corporation	14 foot clear opening - No interpolation with 26'	
10150	11	1004 Shuling Gate Darrier	http://www.tymetal.com/	version	
M30	D1	BM530 12' Gate Barrier	Apex Fabrication & Design, Inc.	12 foot clear opening	
14130	11	BM350 12 Gate Barrier	http://www.apexfab.com/	12 lost clear opening	
M20	D1	DSC8000 Di Fald Cata	Delta Scientific Corporation	12.72 foot aloon anoning	
10150	ΡI	DSC8000 BI-Fold Gale	http://deltascientific.com/	15.75 Toot clear opening	
V12	т 2	CC12 Cata	Bad Day Fabrication	12 feat alors anoning	
K 12	LS	CO12 Gate	https://baddayfab.com/	12 foot clear opening	
V12	т 2	DSC 7500 Bornion	Delta Scientific Corporation	12 foot alors anoning	
K 12	LS	DSC / 500 Barrier	http://deltascientific.com/	12 loot clear opening	
V12	12	K12 Cabla Crash Gata	Betafence	24 foot alors opening	
K 12	LJ	K12 Cable Classi Gate	http://www.betafenceusa.com/	24 loot clear opening	
		AB 466 Anti Rom Vahiala Damian	Heavy Duty Gates, Inc. (fka Morrison		
K12	L3		Equipment)	40 foot clear opening	
		40 11	http://www.heavydutygates.com/		
V12	т 2	Madified Interlasking Einger Cate	Logical Decisions	V shana 12 faat alaan ananing	
K 12	LS	Modified Interlocking Finger Gate	http://ldi.com/ldi-crash-gate.html	v snape, 15 loot clear opening	
		ARMR Model 450 Anti-Climb High			
K12	L1	Security Vehicle Access Control	D&B ARMK	12 foot clear opening	
		Cantilever Gate System	http://www.bb-armr.com/		
M50	D1	Tomobiosis Crosh Cata	Betafence	16.4 foot clear opening, must be installed with	
10130	ГІ	Terrabilock Crash Gate	http://www.betafenceusa.com/	Terrablock M50 passive barriers in configuration	
M50	D1	DSC 299	Delta Scientific Corporation	20 feet alaar enoning	
10130	Γl	DSC 288	http://deltascientific.com/	20 toot clear opening	
M50	D1	Tracked Cate TC M50	Perimeter Security Partners, LLC	7.2 mater aloor expering	
M30	r1	PI Tracked Gate TG M50	http://www.perimetersecuritypartners.com/	7.2 meter clear opening	

			ACTIVE GATE	
Rating	Penetration	Barrier Model/Description	Manufacturer/Designer	Remarks
			Heavy Duty Gates, Inc. (fka Morrison	
M50	P1	SR 466 Anti-Ram Vehicle Barrier	Equipment)	12.75 foot clear opening
			http://www.heavydutygates.com/	
		AP 166 Anti Rom Vehicle Barrier	Heavy Duty Gates, Inc. (fka Morrison	
M50	P1	16.5 ft	Equipment)	16.5 foot clear opening
		10.5 ft	http://www.heavydutygates.com/	
M50	D1	K12 Cable Restraint Barrier 24 ft	Neusch Innovations, LP	24 foot clear opening
10130	11	K12 Cable Restraint Barrier - 24 It		24 loot clear opening
M50	D1	Tomeblook Vahiala Agaga Cata	Praesidiad NV	16.4 foot clear opening, must be installed with
W130	F1	Tenablock Vehicle Access Gale	http://www.praesidiad.com/	Terrablock XV passive barriers in configuration
M50	רת	C 5500 Anti Dom Sliding Coto	Gibraltar Cable Barrier Systems, L.P.	24 feat along anoning
W130	FZ	G-5500 Anti-Kam Shding Gate	http://www.gibraltarmaterials.com/	24 loot clear opening
M50	רת	C 5500 Anti Dom Sliding Coto	Gibraltar Cable Barrier Systems, L.P.	28 fast aloon anoning
W130	FZ	G-5500 Anti-Kam Shding Gate	http://www.gibraltarmaterials.com/	28 loot clear opening
M50	כת	K12 Cable Bestmint Domion 50 ft	Gibraltar Cable Barrier Systems, L.P.	50 fact aloon anoning
WI30	ΓZ	K12 Cable Restraint Barrier - 50 It	http://www.gibraltarmaterials.com/	50 foot clear opening
M50	רת	Creat Cata System Domian	Jamieson Manufacturing Co.	24 feat along anoning
W130	FZ	Clash Gate System Barrier	https://jamiesonfence.com/	24 loot clear opening
M50	רת	K12 Cable Bestmint Domion 50 ft	NEU Security Systems	50 foot aloon anoning
W130	F2	K12 Cable Restraint Barrier - 30 It	http://www.neusecurity.com/	50 loot clear opening
M50	רם	22' Anticulating TCDD Creach Cata	Tymetal Corporation	22 feat aloan anoning
11130	Γ∠	52 Articulating TCKB Classi Gate	http://www.tymetal.com/	52 loot clear opening
		26' v 7' Boy Frome Contilever Slide	Tymetal Corporation	26 foot clear opening. No interpolation with 14?
M50	P2	Cote w/Crosh Beam Model TCCP 12	i yinciai Corporation	20 100t clear opening - 100 interpolation with 14
		Gate w/Clash Deani would TCGK-12	http://www.tymetal.com/	VEISIOII
0720	D1	High Sogurity Formay Formas Cata	JP Novation Sp. z.o.o FANCY FENCE	Gate width 16.24' (4.94 m), foundation width 18.86'
C730	Ч	High Security Fancy Fence Gate	https://fancyfence.eu/pl/	(5.75 m).

			ACTIVE NET		
Rating	Penetration	Barrier Model/Description	Manufacturer/Designer	Remarks	
M40		GRAB-400 - 12 ft	Global GRAB Technologies (fka; FutureNet	12 foot clear opening - interpolation with 60 foot	
	P1		Security Solutions, Smith & Wesson Security	barrier is acceptable with a P2 penetration.	
	11	SEE APPENDIX A	Solutions, Universal Safety Response)	Barrier has a demonstrated characteristic.	
			https://www.grabglobal.com/	SEE APPENDIX A	
		GR 4 B-400 - 60 ft	Global GRAB Technologies (fka; FutureNet	60 foot clear opening - interpolation with 12 foot	
M40	P2	01010-400 - 00 11	Security Solutions, Smith & Wesson Security	barrier is acceptable with a P2 penetration.	
10140	1 2	SEE APPENDIX A	Solutions, Universal Safety Response)	Barrier has a demonstrated characteristic.	
		SEE ALL ENDIX A	https://www.grabglobal.com/	SEE APPENDIX A	
M50	P 1	Swing Gate Access Control Barrier	Barrier1 Systems, Inc.	18' 3" clear opening	
10150	11	Swing Gate Access Control Darrier	http://www.barrier1.us/	18 5 clear opening	
		30' Retractable Net Vehicle Barrier	Barrier 1 Systems Inc	30 foot clear between stanchions - interpolation with	
M50	P2	P2 System	Darrier i Systems, me.	90 foot barrier is acceptable with P3 rating.	
		SEE APPENDIX A	http://www.barrier1.us/	SEE APPENDIX A	
	Р3	90' Retractable Net Vehicle Barrier	Barrier1 Systems Inc	90 foot clear between stanchions - interpolation with	
M50		System	Darrier T Systems, me.	30 foot barrier is acceptable with P3 rating.	
		SEE APPENDIX A	http://www.barrier1.us/	SEE APPENDIX A	
	P2	Retractable Cable Net Vehicle Barrier	Barrier1 Systems Inc	19' 9.5" clear opening between stanchions -	
M50		System - 20 ft	Darrier Systems, ne.	interpolation between 19' 9.5" and 52' 5" is	
		4 Horizontal Cables	http://www.barrier1.us/	acceptable	
	Retractable Cable Net Vehicle Barrier	Barrier 1 Systems Inc	52' 5" clear opening between stanchions -		
M50	P2	System - 52.5 ft	Darrier Systems, ne.	interpolation between 52' 5" and 19' 9.5" is	
		4 Horizontal Cables	http://www.barrier1.us/	acceptable	
		Vehicle Arrestor 2.0-NET-400 Net		80' clear opening between stanchions - interpolation	
M50	P2	Based Active Vehicle Barrier – 80'	Barrier1 Systems, Inc.	between 29' 3" and 80' is acceptable.	
11130	12	SEE APPENDIX A		Barrier has a demonstrated characteristic.	
		SLE ALI LINDIA A	http://www.barrier1.us/	SEE APPENDIX A	
		Vehicle Arrestor 2.0-NET-400 Net		80' clear opening between stanchions - interpolation	
M50	P2	Based Active Vehicle Barrier – 29' 3"	Barrier1 Systems, Inc.	between 29' 3" and 80' is acceptable.	
11130	1 4	SEE ADDENIDIY A		Barrier has a demonstrated characteristic.	
			SEE AFFENDIA A	http://www.barrier1.us/	SEE APPENDIX A

			ACTIVE NET	
Rating	Penetration	Barrier Model/Description	Manufacturer/Designer	Remarks
		CDAD 200 14 ft	Global GRAB Technologies (fka; FutureNet	14 foot clear opening - interpolation with 12 foot
M50	P7	OKAD-300 - 14 II	Security Solutions, Smith & Wesson Security	barrier is acceptable with a P2 penetration.
10150	12	SEE APPENDIX A	Solutions, Universal Safety Response)	Barrier has a demonstrated characteristic.
		SEE AITENDIA A	https://www.grabglobal.com/	SEE APPENDIX A
		$GR \triangle B_{-300} = 62 \text{ ft}$	Global GRAB Technologies (fka; FutureNet	62 foot clear opening - interpolation with 12 foot
M50	P7	GIA ID-500 - 02 It	Security Solutions, Smith & Wesson Security	barrier is acceptable with a P2 penetration.
10150	12	SEE APPENDIX A	Solutions, Universal Safety Response)	Barrier has a demonstrated characteristic.
		SEE AITENDIA A	https://www.grabglobal.com/	SEE APPENDIX A
				21.29' (6.49m) tested width
		2 Defender Net 21'		12.67' (3.86m) clear spacing would result between
			Black Security Products	two adjacent as tested barriers (as measured between
M50 I	D7			major abutment elements)
11130	12			6.34' (1.93 m) clear space exists between edge of
				foundation and the major abutment elements
				35.96' (10.96m) foundation width
				No interpolation with the 72' net allowed
				72.0' (21.95m) tested width
				2.0' (0.61m) clear spacing would result between two
				adjacent as tested barriers (as measured between
M50	D2	Defender Net 72'	Black Security Products	major abutment elements)
11130	12	Defender Net 72		1.0' (0.31m) clear space exists between edge of
				foundation and the major abutment elements
				87.0' (26.52m) foundation width
				No interpolation with the 21' net allowed
M50	D3	Modified Vehicle Arresting System	Engineered Arresting Systems Corporation	24 foot tested width
M50	P3	P3 (VAS) <u>http://www.esco.zodiacaerospac</u>	http://www.esco.zodiacaerospace.com/	24 Ioor testeu wium

	ACTIVE POST AND BEAM				
Rating	Penetration	Barrier Model/Description	Manufacturer/Designer	Remarks	
V/	τ2	Darrier Lift System VA	Perimeter Protection Germany GmbH	0 m (20.5 foot) aloor opening	
174	LJ	Darrier Ent System R4	http://www.perimeterprotection.net/	9 III (29.5 1000) cical opening	
M20	D2	Portable Beam Barricade Model: DSC	Delta Scientific Corporation	16 foot alors apoping	
10130	F 3	1500	http://deltascientific.com/	to toot clear opening	
17.10	L3	.3 SP Patriot	ATG Access, Inc.	12 foot aloon anoning	
K 12			http://www.atgaccessinc.com/	12 loot clear opening	
V12	Т 2	Dorrior Lift System 6m	Perimeter Protection Germany GmbH	6 m clear opening	
K 12	LJ	Banner Ent System – om	http://www.perimeterprotection.net/	No interpolation with 10 m barrier	
V12	тэ	Parrier Lift System K12 10m	Perimeter Protection Germany GmbH	10 m width	
K 12	LZ	Barrier Efft System K12 – 1011	http://www.perimeterprotection.net/	No interpolation with 6 m barrier	
M50	D1	VT 4200 HB Post & Beam Gate	Ross Technology Co.	24 foot clear opening	
19130	1 1	A1-4200-11D 1 0st & Dealit Gate	http://www.rosstechnology.com/	24 foot creat opening	

	ACTIVE WEDGE				
Rating	Penetration	Barrier Model/Description	Manufacturer/Designer	Remarks	
PI 140	рз	DSC 1000 Barrier	Delta Scientific Corporation	12 foot clear opening portable wedge	
1040	1.5		http://deltascientific.com/	12 1000 clear opening, portable wedge	
K4	13	DSC 1200 Barrier	Delta Scientific Corporation	12 foot clear opening	
187	LJ	Dise 1200 Daniel	http://deltascientific.com/		
K4	12	DSC 1100 Quick Beam Deployment	Delta Scientific Corporation	12 foot clear opening surface mounted	
187		Barrier System	http://deltascientific.com/	12 foot clear opening, surface mounted	
		XS-2000-PW, Xpress Series Portable	Harden Architectural Security Products IIC		
K4	L2	Wedge Barrier - (fka- Osprey Series	Harden Arenneetural Security Froducts, EEC	12 foot clear opening, portable wedge	
		Portable Wedge)	https://www.hardensecure.com/xt-1208		
K/	T 1	ARMR Model 850 Portable/Towable	B&B ARMR	Portable wedge	
174	LI	Barrier	http://www.bb-armr.com/	I oftable wedge	
КЛ	T 1	L1 MP5000 Mobile Barrier	Delta Scientific Corporation	12 foot clear opening portable wedge	
174	LI		http://deltascientific.com/	12 loot clear opening, portable wedge	
M20	D1	HD200	Delta Scientific Corporation	0 feat alaar ananing	
IVI30	11	F1 11D200	http://deltascientific.com/	9 loot clear opening	
				9.84' (3.00m) tested width	
M20	D1	OZAK Bood Plocker UDD 20 D 00	Ozak Access Technologies Inc.	4.59' (1.40m) clear spacing would result between	
11130	ГІ	OZAK Road Blocker, HKB 50 K 90		two adjacent as tested barriers	
			https://ozak-t.com	14.44' (4.40m) foundation width	
				9.42' (2.87 m) tested width	
M20	D1	ALUA 212 Automatic Damian	TiSO Production	4.36' (1.33m) clear spacing would result between two	
11130	ΓI	AUIA-315 Automatic Barrier		adjacent as tested barriers	
			https://tiso.global/	13.78' (4.20 m) foundation width	
M20	רם	Dynamid Domion	Mifram Security	2 1 m wide nymemid shares helted to gether	
W130	P2	Pyramid Barrier	http://www.miframsecurity.com/	3 - 1 m wide pyramid snapes bolied together	
M20	D2	MNSD XV Mahila Domion	Nasatka Barrier, Inc.	12 feat along anoning mahile wadee	
W130	P3	WINSD AV WIODIE Barrier	http://www.nasatka.com/	12 loot clear opening, moone wedge	
VQ	т 1	DSC 1100 Quick Beam Deployment	Delta Scientific Corporation	12 fact clear anoming surface mounted	
ГQ	Kð L1 Barrier System http://deltascientific.com/	12 toot clear opening, surface mounted			
M40	D1	CUC2110.9	Secure USA, Inc.	10 foot tosts d width	
10140	۲I	51153110-8	http://www.secureusa.net/	10 loot testea width	

	ACTIVE WEDGE					
Rating	Penetration	Barrier Model/Description	Manufacturer/Designer	Remarks		
M40	P3	MP5000 Mobile Barrier - 16 feet	Delta Scientific Corporation	16 foot clear opening, mobile wedge		
M40	Р3	MP5000 Mobile Barrier - 20 feet	Delta Scientific Corporation http://deltascientific.com/	20 foot clear opening, mobile wedge		
M40	Р3	MNSB XVI Mobile Barrier	Nasatka Barrier, Inc. http://www.nasatka.com/	16 foot clear opening, mobile wedge		
M40	P3	NMSB XVX 20 ft Clear Opening Barrier	Nasatka Barrier, Inc. http://www.nasatka.com/	20 foot clear opening, mobile wedge		
K12	L3	SP Sentinel	ATG Access, Inc. http://www.atgaccessinc.com/	8 foot plate		
K12	L3	ARMR Shallow Mount Plate Barrier Model 820	B&B ARMR http://www.bb-armr.com/	9 foot tested width		
K12	L3	DSC 2000 Barrier	Delta Scientific Corporation http://deltascientific.com/	3 - 2 foot wedges with 18 inch spacing		
K12	L3	Model DSC501 - Phalanx Type Barricade	Delta Scientific Corporation http://deltascientific.com/	9 foot wide plate		
K12	L3	Road Blocker DSP K12	Perimeter Protection Germany GmbH www.perimeterprotection.net	4.6 meter tested width		
K12	L3	MSB II Barrier	Nasatka Barrier, Inc. http://www.nasatka.com/	12 foot clear opening		
K12	L3	Wedge K12	Perimeter Protection Germany GmbH www.perimeterprotection.net	4 meter tested width		
K12	L3	XT-1000-W, Xact Series Wedge Barrier - (fka-Eagle Series Wedge Barrier)	Harden Architectural Security Products, LLC https://www.hardensecure.com/xt-1208	9 foot wide plate		
K12	L3	RSS-2000	RSSI http://www.rssi.com/	4 post configuration - interpolation with 6 post configuration is acceptable, 5 post configuration acceptable		
K12	L3	Phoenix Wedge Barrier	Perimeter Security Partners, LLC (PSP) http://perimetersecuritypartners.com/	8 foot plate		
M50	P1	Electric Wedge Barrier	Barrier1 Systems, Inc. http://www.barrier1.us/	10 foot tested width		
M50	P1	Model 828 Wedge Barrier	B&B ARMR http://www.bb-armr.com/	10 foot tested width		

ACTIVE WEDGE				
Rating	Penetration	Barrier Model/Description	Manufacturer/Designer	Remarks
M50	P1	P1 DS 2000S Road Blocker	Digital & Security Technology Co., LTD	8.2 foot $(2.5 m)$ tested width
IV130	ГІ	DS 20005 Road Blocker	http://www.dnst.co.kr	8.2 100t (2.3 III) tested width
M50	D1	DSC 2078	Delta Scientific Corporation	0 foot wide plate
IV130	ГІ	DSC 2075	http://deltascientific.com/	9 loot wide plate
M50	D1	HD2055	Delta Scientific Corporation	12 feat tested width
IV130	ГІ	11D2035	http://deltascientific.com/	12 loot tested width
M50	D1	HD 200	Delta Scientific Corporation	0' 1" tested width
W130	ΓI	HD 300	http://deltascientific.com/	9 I tested width
N/50	D1	D 1 D11- DC 2000C	Digital & Security Technology Co., LTD	1256-44-4-1
WI30	PI	Road Block DS-3000S	http://www.dnst.co.kr	12.3 loot tested width
N/50	D1	A 120 C/A 260 Outiness	EL-GO TEAM Parking and Security Systems	0.1.5
M30	PI	A-120-C/A-260 Optimus	http://www.elgoteam.com/	8.1 foot tested width
			Global GRAB Technologies (fka: FutureNet	
1450	D 1		Security Solutions, Smith & Wesson Security	9 foot tested width; interpolation with 16 foot width
M50	PI	9 it wedge Barrier	Solutions, Universal Safety Response)	acceptable
			https://www.grabglobal.com/	
			Global GRAB Technologies (fka: FutureNet	
M50	D1	D1 16 & We les Contenue	Security Solutions, Smith & Wesson Security	16 foot tested width; interpolation with 9 foot width
M30	PI	16-ft wedge System	Solutions, Universal Safety Response)	acceptable
			https://www.grabglobal.com/	
N/50	D 1	G-2000 M50-P1 8'0" Wedge	Gibraltar Cable Barrier Systems, L.P.	8'0" clear opening; interpolation with 14'6" width
M30	PI	Barrier	http://www.gibraltarmaterials.com/	acceptable
N/50	D 1	G-2000 M50-P1 14'6" Wedge	Gibraltar Cable Barrier Systems, L.P.	14'6" clear opening; interpolation with 8'0" width
M30	PI	Barrier	http://www.gibraltarmaterials.com/	acceptable
M50	D1	Road Blocker Model GBRH50 Wedge	Guardian Industries Co.	101111 tested width
WI30	PI	Barrier	http://www.guardianind.com/	10 1 tested width
M50	D1	Viper PRSM 1000	Heald Ltd.	0.83° plate
10130	1 1		http://www.heald.uk.com/	9.85 plac
M50	P1	HydraWedge SM50	HySecurity	6.5 foot tested width
		iiijala ii eage siiis i	http://www.hysecurity.com/	
M50	P1	NSMB-IIID-E - 8 ft	Nasatka Barrier, Inc.	8 foot plate
			http://www.nasatka.com/	1
M50	P1	Model III D-E 10' Barrier System	Nasatka Barrier, Inc.	10 foot tested width
10120			http://www.nasatka.com/	

	ACTIVE WEDGE				
Rating	Penetration	Barrier Model/Description	Manufacturer/Designer	Remarks	
M50 P	P 1	Model III D-F 11' Barrier System	Nasatka Barrier, Inc.	11 foot tested width	
	1 1		http://www.nasatka.com/		
M50	P1	Model 3 D-E 12' Barrier System	Nasatka Barrier, Inc.	12 foot tested width	
			http://www.nasatka.com/		
M50	P1	Model III D-E 14' Barrier System	Nasatka Barrier, Inc.	14 foot tested width	
			http://www.nasatka.com/		
M50	P1	ElkostaWedge II	Perimeter Protection Germany GmbH	6.5 foot (1.98m) tested width	
			www.perimeterprotection.net		
M50	D1	DSS 2000M	RSSI	6 post configuration - interpolation with 4 post	
M30	PI	RSS-2000VI		configuration is acceptable, 5 post configuration	
			<u>nttp://www.rssi.com/</u>	acceptable	
M50	P1	SHF3610-12	bttp://socurousa.pot/	14 foot wide plate	
		SHF3614S	SecureUSA Inc		
M50	P1		http://secureusa.net/	10 foot wide plate	
		Road Blocker "AUIA – 333	TiSO Production		
M50	P1	Automatic"	https://tiso.global/	9.42' (2.87 m) tested width	
				14.0' (4.27m) tested width	
1450	D1		Nasatka Barrier, Inc.	2.44' (0.74m) clear spacing would result between two	
M50	PI	NMSB III-D		adjacent as tested barriers	
			http://www.nasatka.com/	16.44^{2} (5.01m) foundation width	
				14.0' (4.27 m) tested width	
				2.00' (0.61 m) clear spacing would result between	
M50	D1	C 2500 14' Wedge Dermion	Gibraltar Cable Barrier Systems, L.P.	two adjacent as tested barriers	
M30	PI	G-2500 14 wedge Barrier		16.0' (4.88 m) foundation width	
				Interpolation with G-2500 8' Wedge Barrier is	
			http://www.gibraltarmaterials.com/	acceptable	
				8.0' (2.74m) tested width	
				2.00' (0.61 m) clear spacing would result between	
M50	D1	G2500 8' Wadge Parrier	Gibraltar	two adjacent as tested barriers	
10130	11	02500 6 wedge Damei		10.0' (3.05m) foundation width	
				Interpolation with G-2500 14' Wedge Barrier is	
			http://www.gibraltarmaterials.com/	acceptable	

			ACTIVE WEDGE	
Rating	Penetration	Barrier Model/Description	Manufacturer/Designer	Remarks
M50	P1	DSC550-10'	Delta Scientific Corporation	 9.67' (2.94m) tested width 2.83' (0.863 m) clear spacing would result between two adjacent as tested barriers. 12.5' (5.94m) foundation width. 2.83' (0.863m) clear spacing would result between two adjacent as tested barriers 12.5' (3.81m) foundation width Interpolation with 16.67' foot width acceptable
M50	Р1	DSC550-16'	Delta Scientific Corporation	16.67' (5.08m) tested width 2.83' (0.863 m) clear spacing would result between two adjacent as tested barriers. 19.5' (5.94m) foundation width. Interpolation with 9.67' width acceptable 2.83' (0.863m) clear spacing would result between two adjacent as tested barriers 19.5' (5.94m) foundation width
			http://deltascientific.com/	Interpolation with 9.67' foot width acceptable
M50	P1	NMSB 3B-2020	Gibraltar	14.0' (4.27 m) tested width 2.09' (0.637m) clear spacing would result between two adjacent as tested barriers 16.0' (4.88 m) foundation width
M50	P1	10' 3 Post Wedge Barrier	Black Security Products	9.96' (3.04 m) tested width 2.87' (0.87m) clear spacing would result between two adjacent as tested barriers 12.83' (3.91 m) foundation width
M50	P1	Shallow Foundation Wedge Barrier	Black Security Products	10' tested width 2' clear spacing would result between two adjacent as tested barriers 12.83' (3.91 m) foundation width
M50	P1	DSSM Wedge Barrier	D & S Technology	9.84' (3 m) tested width 4.2' clear spacing would result between two adjacent as tested barriers 14.04' (4.28 m) foundation width
M50	Р3	Rolle Company "RRB 5100 Road Blocker	Rolle Company	16.34' (4.98 m) tested width 2.71' (0.83m) clear spacing would result between two adjacent as tested barriers
			<u>nttp://www.roncksa.com/</u>	19.05 (3.800 m) foundation width

			ACTIVE WEDGE	
Rating	Penetration	Barrier Model/Description	Manufacturer/Designer	Remarks
M50	נת	MD5000 1(2 Damia 1	Delta Scientific Corporation	16 foot clear opening, mobile wedge Chained To 6
10130	ГJ	MF 5000 TO Barricade	http://deltascientific.com/	Delta Passive Barriers
C720	P1	Road Blocker, Speedbump "AUIA –	TiSO Production	14.25° (4.068 m) tested width
C750		359-04	<u>https://tiso.global/</u>	14.55 (4.000 III) tested width
			Digital and Security Technology Co	11.48' (3.50 m) tested width
H30	P1	Heavy Road Block Barrier	Digital and Security Technology Co.	4.20' (1.28 m) clear spacing would result between
			http://www.dnst.co.kr	15.68' (4.78 m) foundation width

			ACTIVE CABLE	
Rating	Penetration	Barrier Model/Description	Manufacturer/Designer	Remarks
M40	P2	RSSI Cable Trap System	RSSI http://www.rssi.com/	4 - 1" diameter cables, 100' tested total length

	PASSIVE BOLLARD <u>SEE NOTE 5 IN APPENDIX A</u>				
Rating	Penetration	Barrier Model/Description	Manufacturer/Designer	Remarks	
				Single Bollard 6.60" Diameter	
				1.95' clear spacing would result from two adjacent as	
SC40	P1	Reliance Foundry Removable Bollard	Reliance Foundry	tested bollards	
	11	Renalice I buildly Reniovable Donald		2.50' centerline spacing would result from two	
				adjacent as tested bollards	
			https://www.reliance-foundry.com	30" wide foundation	
				Single Bollard 6.61" Diameter	
				1.96' clear spacing would result from two adjacent as	
SC30	P 1	Bollard 150/C40EX 900	Ontario Bollards	tested bollards	
5050	11	Donard 190/C+01 X 900		2.51' centerline spacing would result from two	
			PASSIVE BOLLARD SEE NOTE 5 IN APPENDIX A Manufacturer/Designer Remarks Manufacturer/Designer Single Bollard 6.60" Diameter 1.95' clear spacing would result from two adjacent a tested bollards tollard Reliance Foundry Numufacturer/Designer 1.95' clear spacing would result from two adjacent as tested bollards https://www.reliance-foundry.com 30" wide foundation Single Bollard 6.61" Diameter 1.96' clear spacing would result from two adjacent a tested bollards Ontario Bollards 1.96' clear spacing would result from two adjacent as tested bollards https://ontariobollards.com/ 30.12" wide foundation Single Bollard 6.30" Diameter 1.96' clear spacing would result from two adjacent as tested bollards '40 Reliance Foundry 30.12" wide foundation '40 Reliance-foundry.com 30" wide foundation '40 Single Bollard 6.61" Diameter 1.96' clear spacing would result from two adjacent as tested bollards '40 Reliance-foundry.com 30" wide foundation '40 Single Bollard 6.61" Diameter 1.96' clear spacing would result from two adjacent as tested bollards vable Ontario Bollards 2.50' centerline spacing would result from t		
			https://ontariobollards.com/	30.12" wide foundation	
				Single Bollard 6.30" Diameter	
			Reliance Foundry	1.97' clear spacing would result from two adjacent as	
SC40	P1	Reliance Foundry R-1040-C40		tested bollards	
5010	11	Renalice Foundry R 1010 C 10		 1.96' clear spacing would result from two adjacent as tested bollards 2.51' centerline spacing would result from two adjacent as tested bollards 30.12" wide foundation Single Bollard 6.30" Diameter 1.97' clear spacing would result from two adjacent as tested bollards 2.50' centerline spacing would result from two adjacent as tested bollards 30" wide foundation Single Bollard 6.61" Diameter 1.96' clear spacing would result from two adjacent as tested bollards 2.51' centerline spacing would result from two adjacent as tested bollards 	
	F1 Kenance Fo		https://www.reliance-foundry.com	30" wide foundation	
				Single Bollard 6.61" Diameter	
				1.96' clear spacing would result from two adjacent as	
SC40	P 1	Bollard 150/C40RM 900 removable	Ontario Bollards	 1.96' clear spacing would result from two adjacent a tested bollards 2.51' centerline spacing would result from two adjacent as tested bollards 30.12" wide foundation Single Bollard 6.30" Diameter 1.97' clear spacing would result from two adjacent a tested bollards 2.50' centerline spacing would result from two adjacent as tested bollards 30" wide foundation Single Bollard 6.61" Diameter 1.96' clear spacing would result from two adjacent a tested bollards 2.51' centerline spacing would result from two adjacent a tested bollards 30" wide foundation Single Bollard 6.61" Diameter 1.96' clear spacing would result from two adjacent a tested bollards 2.51' centerline spacing would result from two adjacent a tested bollards 30.12" wide foundation 	
5040	11	Donard 150/040KW 500 Temovable		2.51' centerline spacing would result from two	
				adjacent as tested bollards	
			https://ontariobollards.com/	30.12" wide foundation	
				2-bollard array	
PU50	P2	DSC 650 Shallow Foundation Bollard	Delta Scientific Corporation	3.61' clear spacing (gap between bollards)	
1000		Array		52" centerline spacing	
			http://deltascientific.com/	108" wide foundation	
K4	L3	Shallow Bollard System Barrier	Atlas Security Products, Inc.	5-bollard array	
		Shahow Donard System Danier	http://atlasbarriers.com/	c contaita array	
К4	L3	RB80 Bollard	Weathers Manufacturing, Inc.	48" OC, 3-bollard array	
K4	<u> </u>		http://www.weathersmfg.com/		

	PASSIVE BOLLARD SEE NOTE 5 IN APPENDIX A				
Rating	Penetration	Barrier Model/Description	Manufacturer/Designer	Remarks	
V A	L3	SP1000 Static Shallow Mount Barrier	ATG Access, Inc.	2 hollord array	
Κ4			http://www.atgaccessinc.com/	5-bollaid allay	
VA 12	Shallow Bollard System	SecureUSA, Inc.	5 hollard array		
127	LJ	Shahow Donard System	http://secureusa.net/	5-00haid anay	
				3-bollard array	
M30	P1	M30 Shallow Foundation Modular	Barrier1 Systems, Inc.	3.75' clear spacing (gap between bollards)	
11150	11	Bollard System Test#CV0077		54" centerline spacing	
			http://www.barrier1.us/	168" wide foundation	
				Single bollard	
				4.33' clear spacing would result from two adjacent as	
M30	D 1	Set and Pour Bollard	Barrier1 Systems, Inc.	tested bollards	
	11	Set and I our Donard		5.00' centerline spacing would result from two	
			http://www.barrier1.us/adjacent as tested bollards60" wide foundation		
			http://www.barrier1.us/	60" wide foundation	
				Single modular bollard	
				13.28' clear spacing would result from two adjacent	
M30	D 1	Shallow Foundation Modular Bollard	Barrier1 Systems, Inc.	as tested bollards	
11130	11	System Test #TR2627		168" wide foundation Single bollard 4.33' clear spacing would result from two adjacent as tested bollards 5.00' centerline spacing would result from two adjacent as tested bollards 60" wide foundation Single modular bollard 13.28' clear spacing would result from two adjacent as tested bollards 14.00' centerline spacing would result from two adjacent as tested bollards 14.00' centerline spacing would result from two adjacent as tested bollards 168" wide foundation 3-bollard array 3.70' clear spacing (gap between bollards) 4.59' centerline spacing 165 4" wide foundation	
			http://www.barrier1.us/	168" wide foundation	
				3-bollard array	
M30	D1	Pernovable Bollard Model PB151	BP (Systems) Engineering Pte Ltd	3.70' clear spacing (gap between bollards)	
11130	11	Keniovable Bonard Woder KB151		4.59' centerline spacing	
			http://bpsystems.com.sg/	165.4" wide foundation	
				3-bollard array	
M20	D1	Fixed Pollard Model EP151	BP (Systems) Engineering Pte Ltd	3.70' clear spacing (gap between bollards)	
W130	ГІ	Fixed Bollard Model FB151		4.59' centerline spacing	
			http://bpsystems.com.sg/	165.4" wide foundation	
M20	D 1	M30 D1 Shallow Mount Dollard	Gibraltar	3 hollord array	
10130	ΓI	WISU I I SHAHOW WIGUIN DOHAID	https://gibraltarus.com	5-00llatu altay	

	PASSIVE BOLLARD <u>SEE NOTE 5 IN APPENDIX A</u>				
Rating	Penetration	Barrier Model/Description	Manufacturer/Designer	Remarks	
M30				3-bollard array 8.625" Diameter Bollards 3.78' (1.15 m) clear spacing would result from two adjacent as tested bollards within the 3-bollard array	
	M30	P1	Shaw Stainless & Alloy Shallow Bollard	Shaw Stainless & Alloy	4.5' (1.37 m) centerline spacing would result from two adjacent as tested bollards within the 3-bollard array 8.28' (2.52 m) clear spacing would result between two adjacent as tested 3-bollard arrays
			https://stainlessandalloy.com/	Joint Strict VOLE STRAFFERENTIAL Manufacturer/Designer Remarks 3-bollard array 8.625" Diameter Bollards 3.78' (1.15 m) clear spacing would result from two adjacent as tested bollards within the 3-bollard array 4.5' (1.37 m) centerline spacing would result from two adjacent as tested bollards within the 3-bollard array haw Stainless & Alloy 4.5' (1.37 m) centerline spacing would result from two adjacent as tested bollards within the 3-bollard array haw Stainless & Alloy 4.5' (2.52 m) clear spacing would result from two adjacent as tested 3-bollard arrays p://stainlessandalloy.com/ 5.224" wide foundation. 3-bollard array 4.25' clear spacing would result from two adjacent as tested bollards within the 3-bollard array Barrier1 Systems, Inc. 4.50' centerline spacing would result from two adjacent as tested bollards within the 3-bollard array 3.75' clear spacing would result from two adjacent as tested bollards within the 3-bollard array 3.75' clear spacing would result from two adjacent as tested bollards at Scientific Corporation Single Bollard 8" Diameter 3.45' clear spacing would result from two adjacent as tested bollards 4.17' centerline spacing would result from two adjacent as tested bollards 4.17' centerline spacing would result from two adjacent as tested bollards 4.17' centerline spacing would result from two adjacent as t	
M30	Р1	M40 Shallow Foundation Modular Bollard System Test#CV0068	Barrier1 Systems, Inc.	3-bollard array 4.25' clear spacing would result from two adjacent as tested bollards within the 3-bollard array 4.50' centerline spacing would result from two adjacent as tested bollards within the 3-bollard array 3.75' clear spacing would result between two adjacent as tested 3-bollard arrays	
			http://www.barrier1.us/	168" wide foundation	
M30	P1	DSC630	Delta Scientific Corporation	Single Bollard 8" Diameter 3.45' clear spacing would result from two adjacent as tested bollards 4.17' centerline spacing would result from two adjacent as tested bollards	
			http://deltascientific.com/	50" wide foundation	
M30	P1	DSC633	Delta Scientific Corporation	Single Bollard 8.625" Diameter 3.45' clear spacing would result from two adjacent as tested bollards 4.17' centerline spacing would result from two adjacent as tested bollards	
			http://deltascientific.com/	50.0" wide foundation	

PASSIVE BOLLARD <u>SEE NOTE 5 IN APPENDIX A</u>				
Rating	Penetration	Barrier Model/Description	Manufacturer/Designer	Remarks
				Single bollard 8" Diameter
M30			VE BOLLARD SEE NOTE 5 IN APPENDIX A Manufacturer/Designer Remarks Manufacturer/Designer Single bollard 8" Diameter Apex Fabrication & Design, Inc. 11.28' clear spacing would result from two adjacent as tested bollards http://www.apexfab.com/ 144" wide foundation Ameristar Perimeter Security Systems Single bollard 8.625" Diameter Ameristar Perimeter Security Bollards 12.0° centerline spacing would result from two adjacent as tested bollards http://www.ameristarfence.com/ 144" wide foundation Size' clear spacing would result from two adjacent as tested bollards 3-bollard array 3.28' clear spacing would result from two adjacent as tested bollards 3-bollard array 3.28' clear spacing would result from two adjacent as tested bollards within the 3-bollard array 3.28' clear spacing would result from two adjacent as tested bollards within the 3-bollard array Merristar Perimeter Security Systems 8.625" Diameter Bollards Ameristar Perimeter Security Systems 4.0° clear spacing would result from two adjacent as tested bollards within the 3-bollard array Ameristar Perimeter Security Systems 8.625" Diameter Bollards Attr://www.ameristarfence.com/ 144" wide foundation Single Bollard 12" Diameter 13.27' clear spacing would result from two adjac	
	D1		Apex Fabrication & Design, Inc.	as tested bollards
M30	PI	SFB-M30 Single Bollard		ENDIX A Remarks Single bollard 8" Diameter 11.28' clear spacing would result from two adjacern as tested bollards 12.00' centerline spacing would result from two adjacent as tested bollards 12.00' centerline spacing would result from two adjacern Single Bollard 8.625" Diameter 11.28' clear spacing would result from two adjacern s as tested bollards 12.0' centerline spacing would result from two adjacern as tested bollards 12.0' centerline spacing would result from two adjacern as tested bollards 12.0' centerline spacing would result from two adjacern as tested bollards 12.0' centerline spacing would result from two adjacern as tested bollards 3.28' clear spacing would result from two adjacern as tested bollards within the 3-bollard array 4.00' centerline spacing would result from two adjacern as tested 3-bollard array 4.00' centerline spacing would result from two adjacern as tested 3-bollard array 3.28' clear spacing would result from two adjacern as tested 3-bollard array 4.0' clear spacing would result from two adjacern as tested 3-bollard array 4.0' clear spacing would result from two adjacern at tested bollards within the 3-bollard array 4.72' centerline spacing would result from two adjacern as tested bollards
				adjacent as tested bollards
			http://www.apexfab.com/	144" wide foundation
				Single Bollard 8.625" Diameter
				11.28' clear spacing would result from two adjacent
M20	D1	Single Bulwark Shallow Mount	Ameristar Perimeter Security Systems	as tested bollards
W130	PI	Bollard		12.0' centerline spacing would result from two
				adjacent as tested bollards
			http://www.ameristarfence.com/	144" wide foundation
				3-bollard array
				3.28' clear spacing would result from two adjacent as
				scurity Systems as tested bollards 12.0' centerline spacing would result from two adjacent as tested bollards 144'' wide foundation 3-bollard array 3.28' clear spacing would result from two adjacent as tested bollards within the 3-bollard array Bollards 4.00' centerline spacing would result from two adjacent as tested bollards within the 3-bollard array 3.28' clear spacing would result from two adjacent as tested bollards within the 3-bollard array 3.28' clear spacing would result between two adjacent as tested bollards within the 3-bollard array 3.28' clear spacing would result between two adjacent as tested 3-bollard array as tested 3-bollard array 8.625'' Diameter Bollards
M30	Р2	8" SM Removable K4 Shallow Mount	Calpipe Security Bollards	4.00' centerline spacing would result from two
10100	12	Bollard		adjacent as tested bollards within the 3-bollard array
				3.28' clear spacing would result between two adjacent
				as tested 3-bollard arrays
			http://www.calpipebollards.com/	144" wide foundation
				3-bollard array
				8.625" Diameter Bollards
				4.0' clear spacing would result from two adjacent as
	7.0	3 Bollard Array Bulwark Shallow	Ameristar Perimeter Security Systems	Single bollard 8" Diameter 11.28' clear spacing would result from two adjacent as tested bollards 12.00' centerline spacing would result from two adjacent as tested bollards 144" wide foundation Single Bollard 8.625" Diameter 11.28' clear spacing would result from two adjacent as tested bollards 12.0' centerline spacing would result from two adjacent as tested bollards 12.0' centerline spacing would result from two adjacent as tested bollards 12.0' centerline spacing would result from two adjacent as tested bollards 144" wide foundation 3-bollard array 3.28' clear spacing would result from two adjacent as tested bollards within the 3-bollard array 4.00' centerline spacing would result from two adjacent as tested bollards within the 3-bollard array 3.28' clear spacing would result between two adjacent as tested 3-bollard array 3.28' clear spacing would result from two adjacent as tested 3-bollard array 4.00' centerline spacing would result from two adjacent as tested 3-bollard array 144" wide foundation 3.28' clear spacing would result from two adjacent as tested bollards 4.0' clear spacing would result from two adjacent as tested bollards 4.0' clear spacing would result from two adjacent as tested bollards within the 3-bollard array 1.84' clear spacing would result from two adjacent as tested 3-bollard array
M30	P2	Mount Bollards		4.72' centerline spacing would result from two
				adjacent as tested bollards within the 3-bollard array
				1.84' clear spacing would result between two adjacent
				as tested 3-bollard arrays
			http://www.ameristarfence.com/	144" wide foundation
				Single Bollard 12" Diameter
			Cibrolton Coble Domion Systems, I. D.	13.27 clear spacing would result from two adjacent
M40	P1	G-1441 Ultra-Shallow Bollard	Oldraitar Cable Barrier Systems, L.F.	14.33' centerline spacing would result from two
				adjacent as tested bollards
			http://www.gibraltarmaterials.com/	172" wide foundation

	PASSIVE BOLLARD SEE NOTE 5 IN APPENDIX A				
Rating	Penetration	Barrier Model/Description	Manufacturer/Designer	Remarks	
				Single Bollard 10" Diameter	
M40			PASSIVE BOLLARD SEE NOTE STATPENDIXA Manufacturer/Designer Remarks Gibraltar Cable Barrier Systems, L.P. Single Bollard 10" Diameter 13.44' clear spacing would result from two adjacen as tested bollards 14.33' centerline spacing would result from two adjacen http://www.gibraltarmaterials.com/ 122'' wide foundation 2-bollard array 3.44' clear spacing would result from two adjacent ad Delta Scientific Corporation 4.33' centerline spacing would result from two adjacent ************************************		
	D7	G 1442 Ultra Shallow Bollard	Gibraltar Cable Barrier Systems, L.P.	as tested bollards	
	12	G-1442 Olua-Shallow Dollard		14.33' centerline spacing would result from two	
				adjacent as tested bollards	
			http://www.gibraltarmaterials.com/	172" wide foundation	
				2-bollard array	
				3.44' clear spacing would result from two adjacent as	
				tested bollards within the 2-bollard array	
K12	13	DSC 600 Shallow Frame Bollard	Delta Scientific Corporation	4.33' centerline spacing would result from two	
1112	23	Array		adjacent as tested bollards within the 2-bollard array	
				3.77' clear spacing would result between two adjacent	
				as tested 2-bollard arrays	
			http://deltascientific.com/	108" wide foundation	
				4-bollard array	
				2.10' clear spacing would result from two adjacent as	
				adjacent as tested bollards within the 2-bollard array 3.77' clear spacing would result between two adjacent as tested 2-bollard arrays 108" wide foundation 4-bollard array 2.10' clear spacing would result from two adjacent as tested bollards within the 4-bollard array 3.00' centerline spacing would result from two adjacent as tested bollards within the 4-bollard array 4.60' clear spacing would result between two adjacent as tested 4-bollard arrays	
K12	L3	Model 6 Bollards - 4-bank shallow	Nasatka Barrier, Inc.	3.00' centerline spacing would result from two	
1112	10	mount		Single Bollard 10° Diameter 13.44° clear spacing would result from two adjacent as tested bollards 14.33° centerline spacing would result from two adjacent as tested bollards 14.33° centerline spacing would result from two adjacent as tested bollards 14.33° centerline spacing would result from two adjacent as tested bollards 172° wide foundation 2-bollard array 3.44° clear spacing would result from two adjacent as tested bollards within the 2-bollard array 4.33° centerline spacing would result from two adjacent as tested bollards within the 2-bollard array 3.77° clear spacing would result between two adjacent as tested 2-bollard arrays 2.10° clear spacing would result from two adjacent as tested bollards within the 4-bollard array 2.10° clear spacing would result from two adjacent as tested bollards within the 4-bollard array 3.00° centerline spacing would result from two adjacent as tested 4-bollard array 4.60° clear spacing would result from two adjacent as tested 4-bollard array 3.10° clear spacing would result from two adjacent as tested bollards within the 3-bollard array 3.10° clear spacing would result from two adjacent as tested bollards within the 3-bollard array 3.10° clear spacing would result from two adjacent as tested bollards within the 3-bollard array 3.10° clear spacing would result from two adjacent as tested bollards within the 3-bollard array 3.10° clear spacing would result from two adjacent as tested bollards within the 3-bollard array 3.10° clear spacing would result from two adjacent as tested 3-bollard array 15.10° clear spacing would result between two adjacent as tested 3-bollard arrays 2.88° wide foundation y Products, Inc. barriers.com/	
			2-bollard array2-bollard array3.44' clear spacing would result from two adjacent tested bollards within the 2-bollard array4.33' centerline spacing would result from two adjacent as tested bollards within the 2-bollard array3.77' clear spacing would result between two adjacent as tested 2-bollard arrayhttp://deltascientific.com/108'' wide foundation 4-bollard array4.30' centerline spacing would result from two adjacent as tested 2-bollard arrayNasatka Barrier, Inc.Nasatka Barrier, Inc.100' clear spacing would result from two adjacent at stested bollards within the 4-bollard array 3.00' centerline spacing would result from two adjacent as tested 4-bollard array 4.60' clear spacing would result between two adjacent as tested 4-bollard arrayhttp://www.nasatka.com/174'' wide foundation 3-bollard array3.10' clear spacing would result from two adjacent as tested bollards within the 3-bollard array3.10' clear spacing would result from two adjacent as tested bollards within the 3-bollard array4.00' centerline spacing would result from two adjacent as tested 3-bollard array4.00' centerline spacing would result from two adjacent as tested 3-bollard array4.00' centerline spacing would result from two adjacent as tested 3-bollard array4.00' centerline spacing would result from two adjacent as tested 3-bollard array4.00' centerline spacing would result from two adjacent as tested 3-bollard array4.00' centerline spacing would result from two adjacent as tested 3-bollard array4.00' centerline spacing would result from two adjacent as tested 3-bollard array		
			http://www.nasatka.com/	174" wide foundation	
				3-bollard array	
				 13.44' clear spacing would result from two adjacent as tested bollards 14.33' centerline spacing would result from two adjacent as tested bollards 172" wide foundation 2-bollard array 3.44' clear spacing would result from two adjacent as tested bollards within the 2-bollard array 3.44' clear spacing would result from two adjacent as tested bollards within the 2-bollard array 3.77' clear spacing would result between two adjacent as tested 2-bollard array 3.77' clear spacing would result from two adjacent as tested 2-bollard array 2.10' clear spacing would result from two adjacent as tested bollards within the 4-bollard array 3.00' centerline spacing would result from two adjacent as tested bollards within the 4-bollard array 3.00' centerline spacing would result from two adjacent as tested 4-bollard array 3.10' clear spacing would result from two adjacent as tested bollards within the 3-bollard array 3.10' clear spacing would result from two adjacent as tested bollards within the 3-bollard array 3.10' clear spacing would result from two adjacent as tested bollards within the 3-bollard array 3.10' clear spacing would result from two adjacent as tested bollards within the 3-bollard array 2.10' clear spacing would result from two adjacent as tested bollards within the 3-bollard array 3.10' clear spacing would result from two adjacent as tested bollards within the 3-bollard array 4.00' centerline spacing would result from two adjacent as tested bollards within the 3-bollard array 2.10' clear spacing would result from two adjacent as tested bollards within the 3-bollard array 2.10' clear spacing would result from two adjacent as tested bollards within the 3-bollard array 2.10' clear spacing would result from two adjacent as tested bollards within the 3-bollard array 2.10' clear spacing would result between two adjacent as	
			~	tested bollards within the 3-bollard array	
K12	L3	Shallow Mount Bollards	Sandia National Laboratories	3.44' clear spacing would result from two adjacent as tested bollards within the 2-bollard array 4.33' centerline spacing would result from two adjacent as tested bollards within the 2-bollard array 3.77' clear spacing would result between two adjacent as tested 2-bollard arrays m/ 108" wide foundation 4-bollard array 2.10' clear spacing would result from two adjacent as tested bollards within the 4-bollard array 3.00' centerline spacing would result from two adjacent as tested bollards within the 4-bollard array 4.60' clear spacing would result between two adjacent as tested 4-bollard array 3.10' clear spacing would result from two adjacent as tested 4-bollard array 3.10' clear spacing would result from two adjacent as tested bollards within the 3-bollard array 4.00' centerline spacing would result from two adjacent as tested bollards within the 3-bollard array 5.10' clear spacing would result from two adjacent as tested bollards within the 3-bollard array 4.00' centerline spacing would result from two adjacent as tested bollards within the 3-bollard array 4.00' centerline spacing would result from two adjacent as tested bollards within the 3-bollard array 15.10' clear spacing would result between two adjacent as tested 3-bollard arrays 288" wide foundation Inc. Single bollard	
	20			adjacent as tested bollards within the 3-bollard array	
				15.10' clear spacing would result between two	
				adjacent as tested 3-bollard arrays	
			http://www.sandia.gov/	288" wide foundation	
M50	P1	M50 Shallow Foundation Single	Atlas Security Products, Inc.	Single bollard	
1.10 0		Bollard ASPI-SB-120	http://atlasbarriers.com/	~ mBre comme	

	PASSIVE BOLLARD SEE NOTE 5 IN APPENDIX A				
Rating	Penetration	Barrier Model/Description	Manufacturer/Designer	Remarks	
M50	P1	G-1350 – 3 Bollard Layout	Gibraltar Cable Barrier Systems, L.P.	3-bollard array 4.50' clear spacing would result from two adjacent as tested bollards within the 3-bollard array 5.40' centerline spacing would result from two adjacent as tested bollards within the 3-bollard array 5.31' clear spacing would result between two adjacent as tested 3-bollard arrays 204" wide foundation	
M50	P1	M50 Shallow Foundation Bollard	Gibraltar Cable Barrier Systems, L.P.	3-bollard array 4.50' clear spacing would result from two adjacent as tested bollards within the 3-bollard array 5.40' centerline spacing would result from two adjacent as tested bollards within the 3-bollard array 8.96' clear spacing would result between two adjacent as tested 3-bollard arrays 248" wide foundation	
M50	Р1	Fixed Bollard M50	Perimeter Protection Germany GmbH http://www.perimeterprotection.net/	3-bollard array 3.70' clear spacing would result from two adjacent as tested bollards within the 3-bollard array 4.90' centerline spacing would result from two adjacent as tested bollards within the 3-bollard array 3.80' clear spacing would result between two adjacent as tested 3-bollard arrays 177.6" wide foundation	
M50	P1	Shallow Mount Bollard Single Stand Alone Model SMB-1200- SA	Barrier1 Systems, Inc.	Single bollard 10" Diameter 14.27' clear spacing would result from two adjacent as tested bollards 15.17' centerline spacing would result from two adjacent as tested bollards 182" wide foundation	

	PASSIVE BOLLARD <u>SEE NOTE 5 IN APPENDIX A</u>				
Rating	Penetration	Barrier Model/Description	Manufacturer/Designer	Remarks	
M50	P1	14' Bent Pipe Barrier	NON Proprietary Contact PDC For Engineering Details	Single Bent Pipe 10" Diameter No interpolation with 34' 0.00' clear spacing would result from two adjacent as tested bollards within the 1-bollard array 0.00' centerline spacing would result from two adjacent as tested bollards within the 1-bollard array 2.10' clear spacing would result between two adjacent as tested 1-bollard arrays 204" wide foundation (1)	
M50	P1	34' Bent Pipe Barrier	NON Proprietary Contact PDC For Engineering Details	Single Bent Pipe 10" Diameter No interpolation with 14' 0.00' clear spacing would result from two adjacent as tested bollards within the 1-bollard array 0.00' centerline spacing would result from two adjacent as tested bollards within the 1-bollard array 2.10' clear spacing would result between two adjacent as tested 1-bollard arrays 120" wide foundation (2)	
M50	P2	Single Bollard Vehicle Barrier System TR2450	Barrier1 Systems, Inc. http://www.barrier1.us/	Single bollard 7.10' clear spacing would result from two adjacent as tested bollards 8.00' centerline spacing would result from two adjacent as tested bollards 96" wide foundation	
M50	P2	Set and Pour Fixed Bollard	Barrier1 Systems, Inc	Single bollard 5.10' clear spacing would result from two adjacent as tested bollards 6.00' centerline spacing would result from two adjacent as tested bollards 72" wide foundation	

	PASSIVE BOLLARD <u>SEE NOTE 5 IN APPENDIX A</u>			
Rating	Penetration	Barrier Model/Description	Manufacturer/Designer	Remarks
				3-bollard array
				10" Diameter Bollards
				4.10' clear spacing would result from two adjacent as
			Calpine Security Bollards	tested bollards within the 3-bollard array
M50	P2	K12 Shallow Mount Bollard	Calpipe Security Bollards	5.00' centerline spacing would result from two
				adjacent as tested bollards within the 3-bollard array
				4.10' clear spacing would result between two adjacent
				as tested 3-bollard arrays
			http://www.calpipebollards.com/	180" wide foundation
				3-bollard array with 8' reenforced sidewalk behind it.
		M50 Deep-Mount Bollard TB150 Ten Bollard Chained Array	1-800-Bollards	10.75" Diameter Bollards
				4.10' clear spacing would result from two adjacent as
				tested bollards within the 3-bollard array
M50	P2			5.00' centerline spacing would result from two
				adjacent as tested bollards within the 3-bollard array
				9.10' clear spacing would result between two adjacent
				as tested 3-bollard arrays
			https://www.1800bollards.com/	240" wide foundation
			Delta Scientific Corporation	10 bollard array, Overall length 40.75'
M50	P3			1.75' Clear spacing
1120 0	10			4.25' Centerline spacing
			http://deltascientific.com/	No foundation
				3-bollard array
				10.25" Diameter Bollards
				4.15' clear spacing would result from two adjacent as
1450	D 2	Shallow Mount Bollard	Calpipe Security Bollards	tested bollards within the 3-bollard array
M50	P2	PDT1400SMF		5.00' centerline spacing would result from two
				adjacent as tested bollards within the 3-bollard array
				5.15 clear spacing would result between two adjacent
			http://www.colginshallanda.com/	as tested 3-bollard arrays
			<u>nttp://www.calpipebollards.com/</u>	192" Wide Toundation

		PAS	SIVE BOLLARD SEE NOTE 5 IN APPEND	<u>IX A</u>
Rating	Penetration	Barrier Model/Description	Manufacturer/Designer	Remarks
M50	Р2	DSC635	Delta Scientific Corporation	Single Bollard 10.75" Diameter 5.6' clear spacing would result from two adjacent as tested bollards 6.5' centerline spacing would result from two
			http://deltascientific.com/	adjacent as tested bollards 78" wide foundation
M50	Р2	RSSM50B	RSSI Barriers, LLC	3-bollard array 10" Diameter Bollards 3.10' clear spacing would result from two adjacent as tested bollards within the 3-bollard array 4.0' centerline spacing would result from two adjacent as tested bollards within the 3-bollard array 7.10' clear spacing would result between two adjacent as tested 3-bollard arrays 192" wide foundation
M30	Р2	Shallow Mount Bollard	1-800-Bollards https://www.1800bollards.com	Single Bollard 8.625" Diameter 9.28' clear spacing would result from two adjacent as tested bollards 10.0' centerline spacing would result from two adjacent as tested bollards 120" wide foundation
M50	Р2	BBRSS 315 3 Bollard Array	B&B Roadway and Security Solutions	3-bollard array 12.75" Diameter Bollards 4.0' clear spacing would result from two adjacent as tested bollards within the 3-bollard array 5.06' centerline spacing would result from two adjacent as tested bollards within the 3-bollard array 6.94' clear spacing would result between two adjacent as tested 3-bollard arrays
			https://bbrss.com/	217.5" wide foundation

		PASSI	VE BOLLARD SEE NOTE 5 IN APPEND	<u>PIX A</u>
Rating	Penetration	Barrier Model/Description	Manufacturer/Designer	Remarks
M50	P2	Shaw Stainless & Alloy Shallow Bollard	Shaw Stainless & Alloy	3-bollard array 10.75" Diameter Bollards 4' (1.22 m) clear spacing would result from two adjacent as tested bollards within the 3-bollard array 4.92' (1.50 m) centerline spacing would result from two adjacent as tested bollards within the 3-bollard 8.94' (2.72 m) clear spacing would result between two adjacent as tested 3-bollard arrays 236" wide foundation Must be installed with 4' sidewalk behind the
			https://stainlessandalloy.com/	Toundation
M50	Р2	Fixed 3 Bollard Array	Nasatka Barrier, Inc. http://www.nasatka.com/	3-bollard array 4.52' (1.38 m) clear spacing would result from two adjacent as tested bollards within the 3-bollard array 5.42' (1.65 m) centerline spacing would result from two adjacent as tested bollards within the 3-bollard array 4.10' (1.25 m) clear spacing would result between two adjacent as tested 3-bollard arrays 190'' wide foundation
M50	P3	FB-K12 Fixed Bollard System	Weathers Manufacturing, Inc. http://www.weathersmfg.com/	
M50	Р3	M50 Shallow Foundation Bollard - 40	Gibraltar Cable Barrier Systems, L.P.	3-bollard array 4.49' clear spacing would result from two adjacent as tested bollards within the 3-bollard array 5.40' centerline spacing would result from two adjacent as tested bollards within the 3-bollard array 8.96' clear spacing would result between two adjacent as tested 3-bollard arrays
			http://www.gibraltarmaterials.com/	248" wide foundation
M50	Р3	HBD High Security Fixed Bollard Model HBD 275 S 100	Ozak Access Technologies Inc.	Single bollard 10" diameter 4.04' clear spacing would result from two adjacent as tested bollards 4.92' centerline spacing would result from two adjacent as tested bollards
			https://ozak-t.com	59" wide foundation

		PAS	SIVE BOLLARD SEE NOTE 5 IN APPENDIX	<u>A</u>
Rating	Penetration	Barrier Model/Description	Manufacturer/Designer	Remarks
C750	Р1	Fixed Triple Bollard, "FHCM50"	Fire and Hazard Control Equipment Co. LTD	 3 - 14" (355 mm) diameter bollard array 3.33' (1.015 m) clear spacing would result from two adjacent as tested bollards within the 3-bollard array 4.50' (1.37 m) centerline spacing would result from two adjacent as tested bollards within the 3-bollard 4.28' (1.305 m) clear spacing would result between two adjacent as tested 3-bollard arrays
			<u>n/a</u>	173.23" (4.40 m) wide foundation

	PASSIVE CABLE				
Rating	Penetration	Barrier Model/Description	Manufacturer/Designer	Remarks	
M30	P1	M30 High Performance Post, Rail, and Structural Stand System	Ameristar Perimeter Security Systems	3 - 1" diameter cables, 72' tested length (post to post)	
		- 73 ft (1" cable)	Ameristar Perimeter Security Systems		
M30	P1	BSP M30 Cable Barrier	Black Security Products	90' tested length, 30' intermediate post spacing, 10' line post spacing.	
			http://www.blacksp.com/		
M30	P2	192' Post and Cable Fence Barrier	Atlas Security Products, Inc. http://atlasbarriers.com/	192' tested length, 10' line post spacing	
M40	Р2	M40/P2 High Performance Post, Rail, and Structural Stand System	Ameristar Perimeter Security Systems	3 - 1.25" diameter cables, 72' tested length (post to post)	
		- 73 ft (1.25" cable)	Ameristar Perimeter Security Systems		
M40	Р 2	Cable Tran System	RSSI	4 - 1" diameter cables, 96' tested length (end post to	
10140	12	Cable Trap System	http://www.rssi.com/	end post)	
M50	P1	Ameristar High Performance Post, Rail, and Structural Strand System	Ameristar Perimeter Security Systems	40 foot tested length end post to end post; $3 - 1.5$ "	
		(1.5" cables)	http://www.ameristarfence.com/	cables	
M50	D1	M50/D1 Cable Damier System	Ameristar Perimeter Security Systems	3 - 1.5" diameter cables, 40' tested length (post to	
11130	ГІ	W150/F1 Cable Barrier System	http://www.ameristarfence.com/	post)	
M50	D1	M50 Wire Rope, Post, and Channel	Ameristar Perimeter Security Systems	16' post specing 2 cobles	
11130	ГІ	Rail Anti-Ram Fence	http://www.ameristarfence.com/	10 post spacing, 2 cables	
M50	D1	Barrier Fence System, Model ASPI-	Atlas Security Products, Inc.	2 1.25" diameter applies 64' quatern tested length	
W130	11	CF-M50/P1	CF-M50/P1 <u>http://atlasbarriers.com/</u> 5 – 1.25 drameter car	5 - 1.25 diameter cables, 64 system tested length	
M50	D1	M50 B1 28ft Cable Crash Forag	Betafence	3 strand cable barrier, 168' Tested Length, 28' Crash	
1130	ГІ	W150 F 1 2811. Cable Clash Felice	http://www.betafenceusa.com/	Line Post Spacing	
M50	D1	Bristorm Zero Wire Pone Barrier	Hill & Smith Ltd.	50 foot tested length	
11130	ГІ	Blistolili Zelo wile Rope Ballel	https://hillandsmith.com/	50 foot tested length	
M50	DЭ	High Performance Post, Rail, and	Ameristar Perimeter Security Systems	3 - 1.5" diameter cables, 56' tested length (post to	
10130	Γ∠	Structural Stand System (1.5" cable)	http://www.ameristarfence.com/	post)	
M50	DЭ	Cable Barrier Surface Set – Short	Barrier1 Systems, Inc.	18 1' algar gable gran 8 blogha	
M50	P2	Span Model CBSS-1200	http://www.barrier1.us/	18.1 clear cable span, 8 blocks	

			PASSIVE CABLE	
Rating	Penetration	Barrier Model/Description	Manufacturer/Designer	Remarks
M50	P2	M50 Post and Cable System – 50 ft	Global GRAB Technologies (fka: FutureNet Security Solutions, Smith & Wesson Security Solutions, Universal Safety Response) <u>https://www.grabglobal.com/</u>	tested length - 50 foot, center of end post to center of end post, interpolation with 200ft barrier is acceptable
M50	Р2	M50 Post and Cable System – 200 ft	Global GRAB Technologies (fka: FutureNet Security Solutions, Smith & Wesson Security Solutions, Universal Safety Response) <u>https://www.grabglobal.com/</u>	tested length - 200 foot, center of end post to center of end post, interpolation with 50ft barrier is acceptable
M50	P2	M50 P2 Cable Crash Fence	Betafence <u>http://www.betafenceusa.com/</u>	3 strand cable barrier, 600' between terminal posts, 200' between line posts
M50	P2	BSP M50 Cable Barrier	Black Security Products <u>http://www.blacksp.com/</u>	90' tested length, 30' intermediate post spacing, 10' line post spacing.
M50	Р2	Typhon Cable Barrier 40' Span	Perimeter Security Partners, LLC http://www.perimetersecuritypartners.com/	40.0' tested length, 10.0' line post spacing. Interpolation with 200.0' barrier is acceptable
M50	P2	Typhon Cable Barrier 200' Span	Perimeter Security Partners, LLC http://www.perimetersecuritypartners.com/	200.0' tested length, 10.0' line post spacing. Interpolation with 40.0' barrier is acceptable
M50	Р2	100' M50P2 Cable Barrier	Black Security Products http://www.blacksp.com/	100' tested length, 20' line post spacing, 10' intermediate post spacing. Two strands of 6x36 1 3/8" wire rope.
M50	P2	600' 2 Strand Cable Fence	Black Security Products http://www.blacksp.com/	600' tested length, 200' line post spacing, 13'4" intermediate post spacing.
M50	Р3	High Performance Post, Rail, and Structural Stand System - 41 ft (1.25" cable)	Ameristar Perimeter Security Systems <u>Ameristar Perimeter Security Systems</u>	3 - 1.25" diameter cables, 40' tested length (post to post)
M50	Р3	Cable Barrier Surface Set Model CBSS-1200 Three Strand Cable Barrier – Long Span	Barrier1 Systems, Inc. http://www.barrier1.us/	67' 8" clear cable span, 8 blocks

			PASSIVE PORTABLE	
Rating	Penetration	Barrier Model/Description	Manufacturer/Designer	Remarks
SC30	P2	Meridian Archer 1200 Portable Barrier	Meridian Rapid Defense	System composed of 4-24" modules connected by wire rope. Tested for impact at the center of the 4
		Darrier	https://www.meridianrapiddefense.com	module system.
DI 120	D2	EMD Domion	Mifram Security	7.142 m tostad width
1030	15	TWD Darrier	http://www.miframsecurity.com/	7.142 III tested width
M20	רם	G-6532 M30 P2 20ft Modular Vehicle	Gibraltar Cable Barrier Systems, L.P.	Tostad lanoth 20'
W130	P2	Barrier	http://www.gibraltarmaterials.com/	Tested length 20
M30	Р2	Modular Portable Protection Device	Black Security Products	System consisted of 3 42' spans with ballast between each span and at each end of the system. Tested only for impact on center 42' span. Listing applies to the
			http://www.blacksp.com/	center 42' span.
M30	P2	Cable Block Barrier Model CBB- 400	Barrier1 Systems, Inc.	Five 72" Block System. Tested for impact at center of system. Listing applies for impact at center of 4 - 72" blocks portion of the 5 block system which are separated by synthetic rope connection of 12"
			Delte Scientific Comparation	separated by synthetic tope connection of 12.
M30	P3	TB 100 Five Bollard Array	betta scientific Corporation	Five Bollard Array
			<u>http://deitascientific.com/</u>	2 Complete Assemblies Necessary for Dating
M30	D3	P3 K2600 Mobile/Portable VSB	Rologard Global Company	Z Complete Assemblies Necessary for Rating
W130	P3		https://www.rologard.com/	Tested Length for each assembly 86"
			https://www.fologard.com/	21 Water Filled, apple linked modules arranged in 2
M40	D)	Sentry II Security Barrier	TrafFix Devices Incorporated	rows. Tested for impact at the center of the 31-module
101-10	1 2	r 2 Sentry II Security Barrier	https://www.traffixdevices.com/	system
			Munio Technologies LLC	Barrier width 22' Metal assemblies spaced at 16' on
M50	P1	Portable Security Barrier	https://muniotechnologies.com/	center
		-	https://muniotechnologies.com/	center.

			PASSIVE POST AND BEAM	
Rating	Penetration	Barrier Model/Description	Manufacturer/Designer	Remarks
			Surface Deployment and Distribution Command	
ES20	D1	Non Proprietory ES20 D1 Parrier	Traffic Engineering Agency	Tested length 177' guard rail
F530	ГІ	Non-Frophetary F550 FT Damer	https://www.sddc.army.mil/sites/TEA/Pages	rested lengul 177 guard fair
			/default.aspx	
M20	D1	C Earso M20 Post and Poom	Gibraltar Cable Barrier Systems, L.P.	Tostad longth 140' 0' and post to and post
M30	PI	G-Force M50 Post and Beam	http://www.gibraltarmaterials.com/	Tested length 140 9 end post to end post
M20	D1	C Earse M20 Dest and Desr	Gibraltar Cable Barrier Systems, L.P.	Tested length 28'9" Centerline terminal post to
M30	PI	G-Force M50 Post and Beam	http://www.gibraltarmaterials.com/	centerline terminal post.
			Surface Deployment and Distribution Command	
M20	D1	Non Promistory M20 D1 Domise	Traffic Engineering Agency	Tested law oth 177' SPECIALIZED ground will
W130	PI	Non-Proprietary M30 P1 Barrier	https://www.sddc.army.mil/sites/TEA/Pages	Tested length 177 SPECIALIZED guard rail
			/default.aspx	
M40	רם	C Fores M40 Post and Posm	Gibraltar Cable Barrier Systems, L.P	Tastad langth 402' and past to and past
W140	FZ	G-Force M40 Post and Beam	http://www.gibraltarmaterials.com/	Tested length 492 end post to end post
M50	D1	C Earse M50 Dest and Desr	Gibraltar Cable Barrier Systems, L.P	Tested length 140° 0" and next to and next
WI30	PI	G-Force M50 Post and Beam	http://www.gibraltarmaterials.com/	Tested length 140 9 end post to end post
M50	ח1	C Forme Dest and Desm	Gibraltar Cable Barrier Systems, L.P	Tested length 140° 0" and next to and next
WI30	PI	G-Force Post and Beam	http://www.gibraltarmaterials.com/	Tested length 140' 9" end post to end post
M50	ח1	G-Force Combination Fence 90 Meter	Gibraltar Cable Barrier Systems, L.P	Tested longth 00 m 2 m post specing
M50	P1	Run	http://www.gibraltarmaterials.com/	Tested length 90 m, 5 m post spacing
M50	D1	A DES 466	Morrison Equipment	Tostad longth 20.0 m 10.2 m post angeing
M50	PI	P1 ARFS 466	http://heavydutygates.com/	1 ested length 30.9 m, 10.3 m post spacing

			PASSIVE FENCE	
Rating	Penetration	Barrier Model/Description	Manufacturer/Designer	Remarks
K8	T 1	Perimeter Security Fence with One-	Ameristar Perimeter Security Systems	
Ko	LI	Inch Cable and Diagonal	http://www.ameristarfence.com/	
VQ	1.2	Impage Perimeter Security Fence	Ameristar Perimeter Security Systems	2 1" diameter capilor 162 fact tested length
Ko	LZ	impasse refineter security rence	http://www.ameristarfence.com/	2 - 1 diameter cables, 102 foot tested length
VQ	тр	Perimeter Security Fence with 1 in	Ameristar Perimeter Security Systems	2 1" diameter applage 22.67' hotwaan nasta
Кð	LZ	Cable and Bollard Anchorage	http://www.ameristarfence.com/	2 -1 diameter cables; 52.67 between posts
VO	тр	Perimeter Security Fence with One-	Ameristar Perimeter Security Systems	2 1" diameter apples 162 fact tested lar oth
Кð	LZ	Inch Cable and Bollard Anchorage	http://www.ameristarfence.com/	2 - 1 diameter cables, 162 foot tested length
V12	т 2	L3 Impasse Security Fencing	Ameristar Perimeter Security Systems	2 1" diameter applage 22.67 ft between nosts
K12	LS		http://www.ameristarfence.com/	2-1 diameter cables, 52.07 it between posts
V12	т 2	Cable Creak Farme	Betafence	60 fact anon terminal past to terminal past
K12	LS	Cable Classi Felice	http://www.betafenceusa.com/	oo loot span, terminal post to terminal post
M50	D1	DSS E501D Tube Deem Ferrer	Ross Security Systems LLC	Type have anothing 20 ft most anothing
M30	PI	KSS-F301D Tube Beam Fence	http://www.rosssecuritysolutions.com/	Tube beam sections, 50 ft post spacing
1450	רת	M50 D2 Citrate Cable Creat Farage	Gibraltar Cable Barrier Systems, L.P.	200 fast man main nost to main nost
M30	P2	M30 P2 Gloraltar Cable Crash Fence	http://www.gibraltarmaterials.com/	200 foot span main post to main post
N/50		D	Ameristar Perimeter Security Systems	2 1 25" 1:
M50	P2	P2 Perimeter Security Stalwart Shield	http://www.ameristarfence.com/	$3 - 1.25^{\prime\prime}$ diameter cables. $40^{\prime}10^{\prime\prime}$ tested length.

			PASSIVE INERTIAL	
Rating	Penetration	Barrier Model/Description	Manufacturer/Designer	Remarks
V12	т 2	Expeditionery Forth Filled Domion	DefenCell	Forth filled homion
K 12	LS	Expeditionary Earth Filled Barrier	http://www.defencell.com/	Earth filled barrier
K12	13		Geocell Systems Inc.	Forth filled barrier
K12	LJ	KDI W WK. 4	http://www.geocellsystems.com/	
V12	12	HESCO SL 3636 (fka-C-3315	HESCO Bastion Ltd.	Earth filled harrier
K12	LJ	Flood Barrier)	http://www.hesco.com/	
M50	D1	Tomoblock M50	apexfence	Sand filled harrier with fance
11130	11		http://www.betafenceusa.com/	Sand fined barrier with fence
M50	D1	Terrablack XV	Praesidiad NV	Sand filled harrier with fence
10130	11	I CHADIOCK AV	http://www.praesidiad.com/	Sand Inica Garrier with felice

APPENDIX A

Important vehicle Barrier Characteristics:

1. GRAB Net type barriers:

Demonstrated Characteristics: Some types of these barriers result in a undesirable characteristic when inpacted by a certain type of vehicle.

Resolution:

ARMY PROJECTS: Products do not currently meet requirements contained in the Army Standards for Access Control Points/Army Standard Design for Access Control Points and are NOT to be used on Army Projects. Contract PDC for additional information.

AIR FORCE PROJECTS: Products recommended not to be installed in Air Force projects. Contract AFCEC or the PDC for additional information.

2. Barrier 1 Net Type Barriers with net trap

Demonstrated Characteristics: Some issues with roadway pavement expansion causing the lid of the trap area to not close correctly after a barrier deplyment.

Resolution: Expansion joints might have to be installed near the barrier on certain types of roadways.

3. Barrier 1 Vehicle Arrestor 2.0-NET-400

Demonstrated Characteristics: Some types of these barriers result in a undesirable characteristic when inpacted by a certain type of vehicle.

Resolution:

ARMY PROJECTS: Products do not currently meet requirements contained in the Army Standards for Access Control Points/Army Standard Design for Access Control Points and are NOT to be used on Army Projects. Contract PDC for additional information.

AIR FORCE PROJECTS: Products recommended not to be installed in Air Force projects. Contract AFCEC or the PDC for additional information.

4. Barrier 1 Retractable Net Vehicle Barrier Systems

Demonstrated Characteristics: Some types of these barriers result in a undesirable characteristic when inpacted by a certain type of vehicle.

Resolution:

ARMY PROJECTS: Products do not currently meet requirements contained in the Army Standards for Access Control Points/Army Standard Design for Access Control Points and are NOT to be used on Army Projects. Contract PDC for additional information.

AIR FORCE PROJECTS: Products recommended not to be installed in Air Force projects. Contract AFCEC or the PDC for additional information.

5. Bollard Spacing

Demonstrated Characteristic: Some manufacturers are testing single bollards with foundations having significant width. Use of these products in the as tested configuration may not be feasible. To retain their rating, DOS tested and ASTM tested products are to be fielded in the as tested configuration. Single bollards with wide foundations cannot be fielded in the as tested configuration for vehicles to circumvent the system.

Resolution: Utilize products that can be fielded in the as tested configuration. Many bollards are tested in sets and some have compliant spacing.

6. Bollard Type Active Barriers

Demonstrated Characteristic: Small angular particles have moved into the sleeve of the bollard and prevented either deployment or retraction of the bollard(s).

Resolution: Avoid use of bollards where sharp angular particles or aggregate are found on or adjacent to the roadway. This includes sand and gravel. Also applicable in areas where snow/ice require application of sand or gravel to roadways.

7. All active vehicle barriers that include below grade components or pits.

Demonstrated Characteristic: Sump systems have been deactivated when active vehicle barriers were shut off. Barriers filled with water and were compromised.

Resolution: Place sump systems on a separate circuit or otherwise ensure that sump systems are not deactivated.

8. All active vehicle barriers spanning more than one roadway lane.

Demonstrated Characteristic: Activation of detection devices in any lane will prevent barrier deployment and result in open corridor(s) for a potential threat vehicle to utilize.

Resolution: Utilize individual active vehicle barrier installed in each lane. If a detection device is activated it will prevent deployment of the active vehicle barrier for that lane only. The rest of the corridor will be blocked by active vehicle barriers and the lane with the activated detection device will be partially blocked by the vehicle that activated the detection device.

9. Drain openings and drain lines for active vehicle barrier pits.

Drain lines for active vehicle barrier pits (whether sump pump or gravity drained) are often of insufficient diameter. Drain lines clog with debris often and active vehicle barrier pits fill with water.

Resolution: Ensure that drain lines and inlets are a minimum of 4" in diameter. Reduce surface water and storm water drainage into the active vehicle barrier pit through use of storm drains and flumes.

APPENDIX B

Test Produres Vehicle Characteristics:

ASTM F2656:

Kinetic Energy Designation:

SC30 = 2,420# Small Passenger Car at 30mph (78,000 ft-lbs of kinetic energy) SC40 = 2,420# Small Passenger Car at 40mph (131,000 ft-lbs of kinetic energy) SC50 = 2,420# Small Passenger Car at 50mph (205,000 ft-lbs of kinetic energy) SC60 = 2,420# Small Passenger Car at 60mph (295,000 ft-lbs of kinetic energy) FS30 = 4,630# Full-size Sedan at 30mph (137,000 ft-lbs of kinetic energy) FS40 = 4,630# Full-size Sedan at 40mph (247,000 ft-lbs of kinetic energy) FS50 = 4,630# Full-size Sedan at 50mph (387,000 ft-lbs of kinetic energy) FS60 = 4,630 # Full-size Sedan at 60mph (557,000 ft-lbs of kinetic energy) PU30 = 5,000# Pickup Truck at 30mph (164,000 ft-lbs of kinetic energy) PU40 = 5,000 # Pickup Truck at 40mph (273,000 ft-lbs of kinetic energy) PU50 = 5,000# Pickup Truck at 50mph (426,000 ft-lbs of kinetic energy) PU60 = 5,000# Pickup Truck at 60mph (613,000 ft-lbs of kinetic energy) M30 = 15,000# Standard Test Truck at 30mph (451,000 ft-lbs of kinetic energy) M40 = 15,000# Standard Test Truck at 40mph (802,000 ft-lbs of kinetic energy) M50 = 15,000# Standard Test Truck at 50mph (1,250,000 ft-lbs of kinetic energy) C7-30 = 15,873# Class 7 Cabover at 30mph (497,000 ft-lbs of kinetic energy) C7-40 = 15,873# Class 7 Cabover at 40mph (1,381,000 ft-lbs of kinetic energy) C7-50 = 15,873 # Class 7 Cabover at 50mph (1,950,000 ft-lbs of kinetic energy) H30 = 65,000# Heavy Goods Vehicle at 30mph (1,950,000 ft-lbs of kinetic energy) H40 = 65,000 # Heavy Goods Vehicle at 40mph (3,470,000 ft-lbs of kinetic energy) H50 = 65,000# Heavy Goods Vehicle at 50mph (5,430,000 ft-lbs of kinetic energy) **Penetration Ratings:** P1 = Less than 3.3' of penetration

P2 = 3.31' to 23.0' of penetration P3 = 23.1' to 98.4' of penetration

DOS (SD-STD)

Kinetic Energy Designation:

K4 = 15,000# Standard Test Truck at 30mph (450,000 ft-lbs of kinetic energy)

K8 = 15,000# Standard Test Truck at 40mph (800,000 ft-lbs of kinetic energy)

K12 = 15,000# Standard Test Truck at 50mph (1,250,000 ft-lbs of kinetic energy) Penetration Ratings (Prior to 2003):

L3 = 3' or less

L2 = 3.01' to 20.0' of penetration

L1 = 20.01' to 50' of penetration

Penetration Ratings (After 2003):

As of 2003 all barriers will have penetration of 3.3' or less