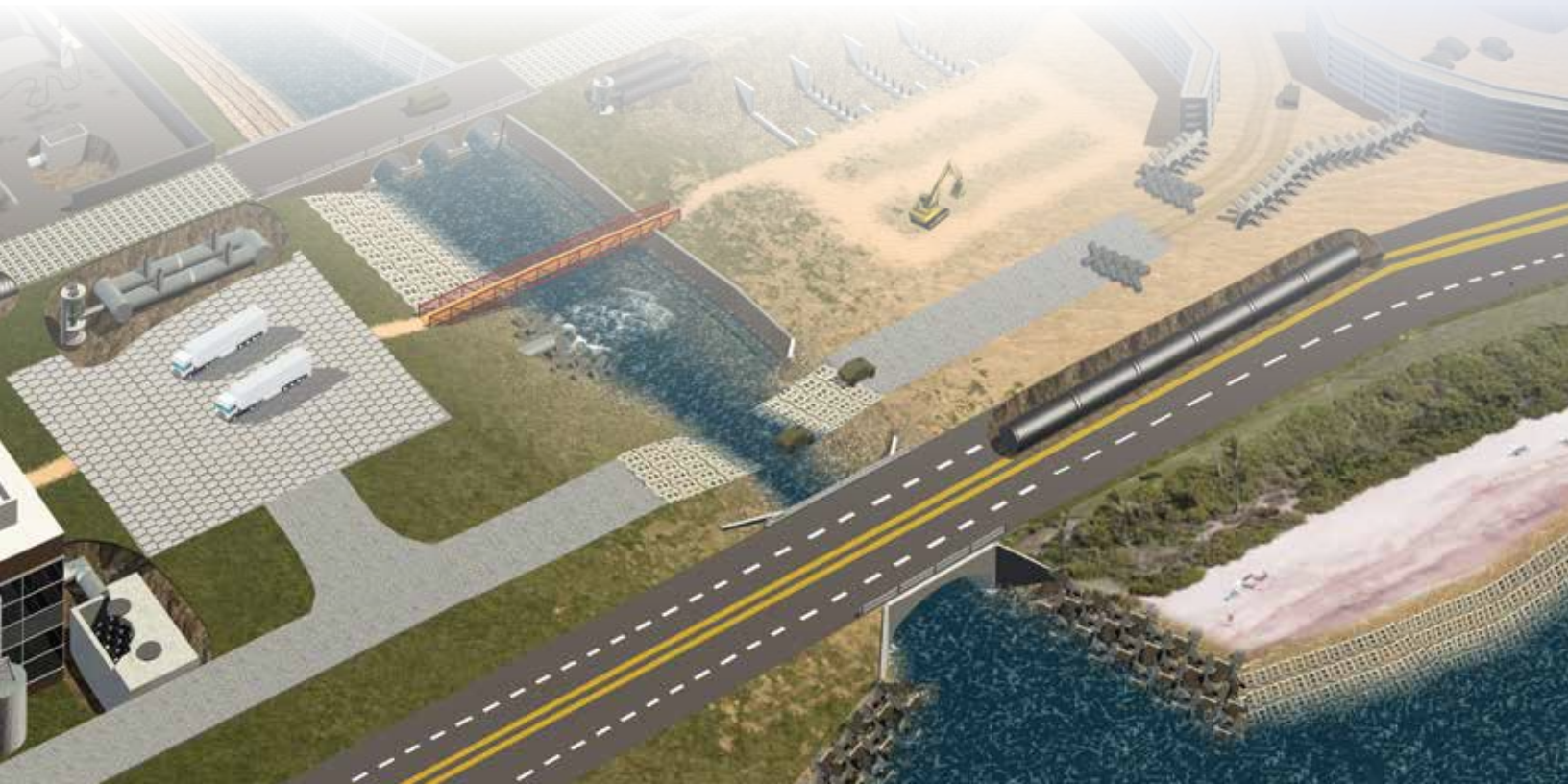
ARMORTEC®
Erosion Control Solutions

ARMORTEC® REFERENCE GUIDE

CONTECH®
ENGINEERED SOLUTIONS

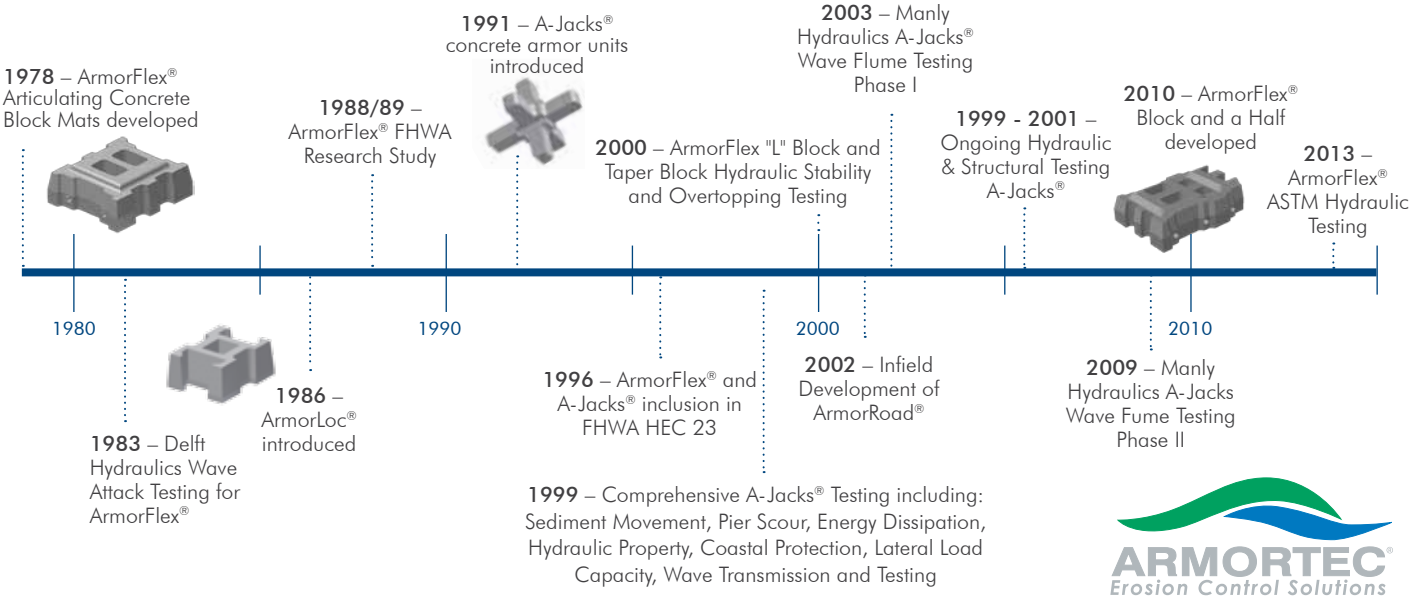
ARMORTEC® HARD ARMOR SOLUTIONS



ARMORTEC HARD ARMOR SOLUTIONS.

A LEGACY OF SUCCESS

Doing the seemingly impossible is an everyday job. With erosion control systems for any need in any application, Contech Engineered Solutions delivers a range of effective, efficient solutions. Our engineered systems provide performance-tested solutions for a wide variety of applications including channel lining, shoreline protection, dam crests and spillways, energy dissipation, pipeline and cable protection, bridge and abutment protection, boat ramps, low water crossings, outfall protection, wave attack protection and more.



BUILDING CONFIDENCE EVERY STEP OF THE WAY

	ARMORTEC SOLUTIONS	VS.	TRADITIONAL RIP-RAP
RESEARCH & DEVELOPMENT	ASTM TESTING PROTOCOL COMPLIANT FULL-SCALE TESTING		SCALE MODEL TESTING
DESIGN	CONSISTENT & CONSERVATIVE INDUSTRY DESIGN GUIDELINES		RECOMMENDED GRADATION VARIES WITH METHODOLOGY
QUALITY CONTROL	MANUFACTURED UNDER CONTROLLED CONDITIONS IN COMPLIANCE WITH ASTM ESTABLISHED STANDARDS		RANDOM QUARRIED MATERIAL WITH LIMITED QUALITY CONTROL
CONSTRUCTION	CONFIDENT & SELF-EVIDENT PLACEMENT QUALITY		VARIABLE PARTICLE DISTRIBUTION

INCREASE YOUR CONFIDENCE WITH ARMORTEC

PROCESS – DESIGN, PREFABRICATION, INSTALL.

	ARMORFLEX®	HAND-PLACED	A-JACKS®
PRODUCTION			
TRANSPORTATION			
SITE PREPARATION			
INSTALLATION			
COMPLETION			

ARMORFLEX® ARTICULATING CONCRETE BLOCKS

OPEN CELL BLOCK DESIGN ALLOWS FOR REVEGETATION

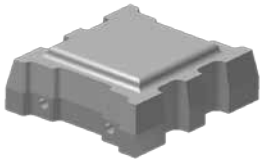
CLOSED CELL BLOCK DESIGN ALLOWS FOR HEAVY LOADING

BOTH BLOCKS READILY ADAPT TO COMPLEX SITE GEOMETRIES

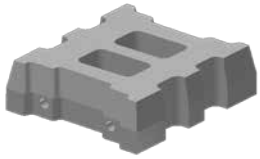
BLOCK OPTIONS

Open-Cell Block

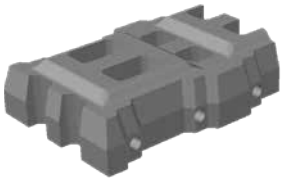
Closed-Cell Block



Tapered-Cell Block



Block and a Half®



ARMORFLEX UNIT SPECIFICATION

Block Class	Open/Closed Cell	Nominal Thickness	Gross Area (sf)	Block Weight (lbs)	Open Area %
30-S	Open	4.75	0.98	33-35	20
50-S	Open	6.00	0.98	42-45	20
40	Open	4.75	1.77	59-64	20
50	Open	6.00	1.77	76-82	20
70	Open	8.50	1.77	108-117	20
40-L	Open	4.75	2.58	97-105	20
70-L	Open	8.50	2.58	174-188	20
45-S	Closed	4.75	0.98	39-42	10
55-S	Closed	6.00	0.98	50-54	10
45	Closed	4.75	1.77	71-77	10
55	Closed	6.00	1.77	91-98	10
85	Closed	8.50	1.77	136-146	10
45-L	Closed	4.75	2.58	109-118	10
85-L	Closed	8.50	2.58	207-223	10
High Velocity Application Block Classes					
40-T	Open	4.75	1.77	58-63	20
50-T	Open	6.00	1.77	75-81	20
70-T	Open	8.50	1.77	116-124	20

ARMORFLEX® ARTICULATING CONCRETE BLOCKS

APPLICATIONS

- Channel Lining
- Shoreline Protection
- Scour Protection
- Slope Protection
- Outfall Protection
- Pipeline & Cable Protection
- Weirs
- Spillways
- Dam Overtopping
- Emergency Overflows
- Grade Transitions
- Intercoastal Waterways
- Bays
- Lakes
- Reservoirs
- Low Water Crossings
- Boat Ramps
- Down Chutes

Dam Overtopping

SCOUR PROTECTION

SHORELINE PROTECTION

VEGETATED SLOPE

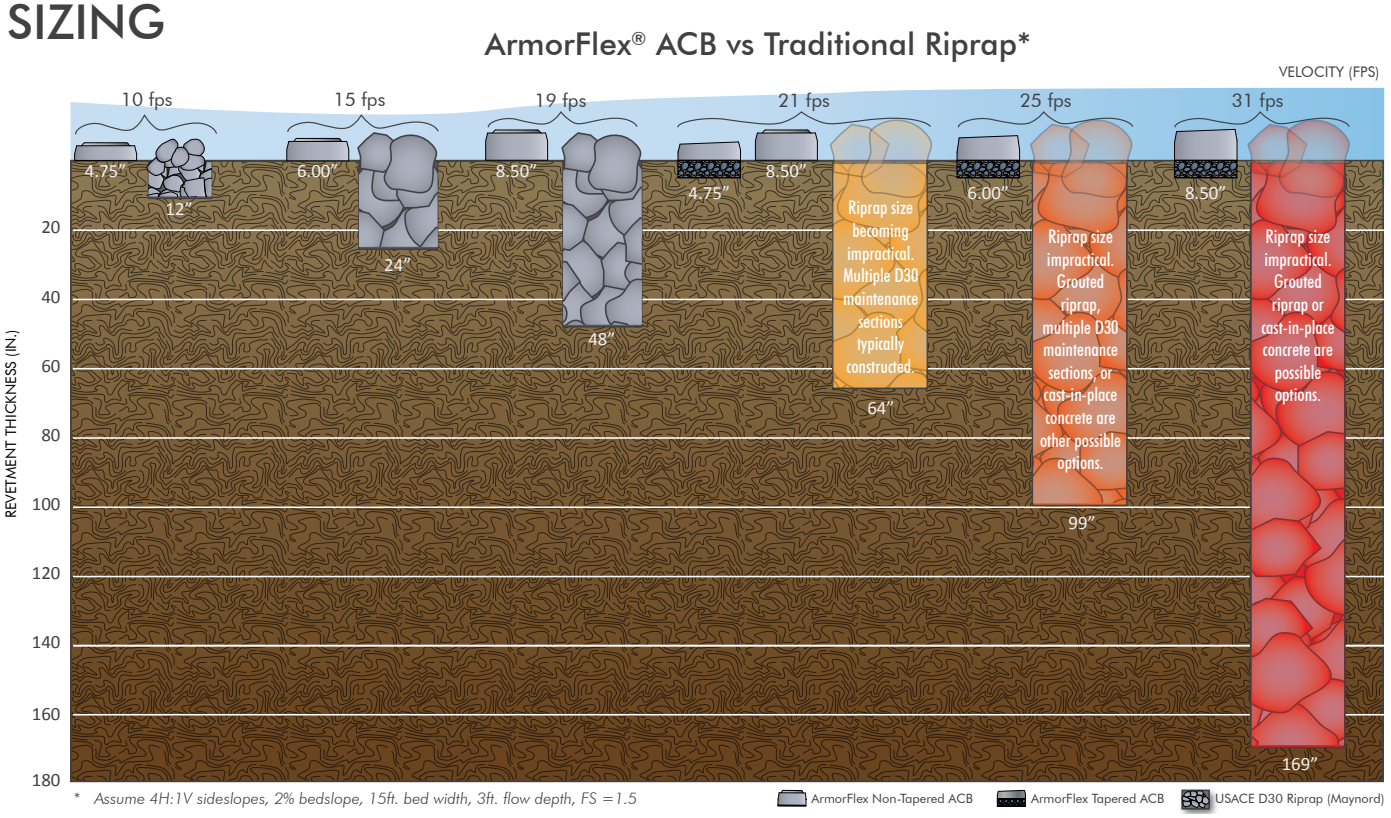
CHANNEL LINING

SUBMERGED ARMORING

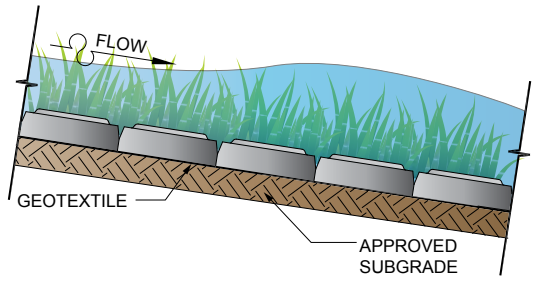
MATTED SOLUTIONS

ARMORFLEX® DESIGN CONSIDERATIONS

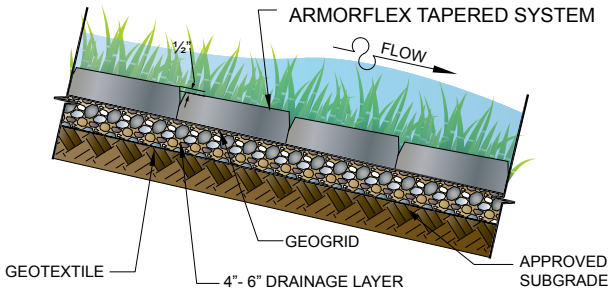
SIZING



TYPICAL CROSS SECTIONS (not to scale)



Standard Cross Section



Tapered Series - Cross Section

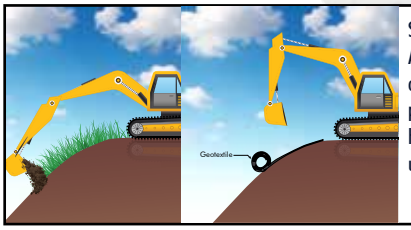
REFERENCES AND STANDARDS

- National Concrete Masonry Association (2010), "Design Manual for Articulating Block (ACB) Revetment Systems", NCMA Publication TR 220A
- ASTM D 7276 – Standard Guide for Analysis and Interpretation of Test Data for ACB Revetment Systems in Open Channel Flow
- ASTM D 7277 – Standard Test Method for Performance Testing for ACB Revetment Systems for Hydraulic Stability in Open Channel
- ASTM D 6684 – Standard Specification for Materials and Manufacture of Articulating Concrete Block (ACB) Revetment Systems
- ASTM D 6884 – Standard Practice for Installation of Articulating Concrete Block (ACB) Revetment Systems
- FHWA Hydraulic Engineering Circular NO. 23: Bridge Scour and Stream Instability Countermeasures: Experience, Selection and Design Guidance – Third Edition, Volume II, Design Guideline 8.
- USDOT Federal Highway Administration Hydraulic Engineering Circular NO. 15, Third Edition (2005) "Design of Roadside Channels with Flexible Linings" National Highway Institute.
- Julien, Pierre Y. (2010) "Erosion and Sedimentation", 2nd Edition, Cambridge University Press

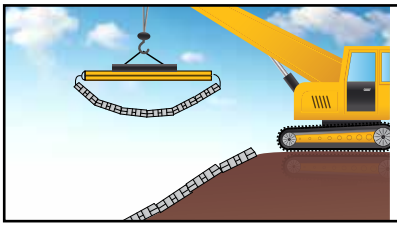
ARMORFLEX® INSTALLATION

THE ARMORTEC® HARD ARMOR ADVANTAGE

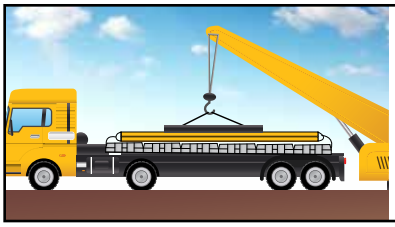
PROCESS



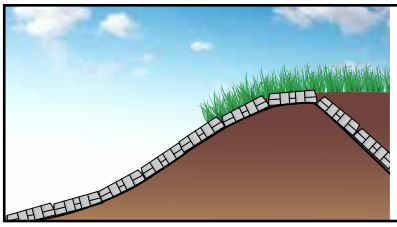
Step 1:
ArmorFlex arrives on-site as a system of factory-assembled mats. ArmorFlex is placed on a site specific geotextile which has been placed on a prepared subgrade using conventional construction equipment.



Step 3:
ArmorFlex Mats are placed according to the site plans with appropriately sized equipment. Above normal waterline mats may be topsoiled and seeded to give a vegetated effect.



Step 2:
Mats are supplied on flat bed trailers. Mats can be handled with a spreader bar which can be rented from Contech.



Step 4:
Proper toe trench requires a minimum of two rows of block buried below predicated soil depth. Tapered series block or mats subject to wave attack are required to have a bedding layer of crushed stone or gravel.

* *See ArmorFlex Installation Guide for additional information.*

ARMORROAD® CONCRETE UNITS

APPLICATIONS

- Industrial Yards
- Durable Driving Surface
- Temporary Road
- Lay Down Yard
- Heaving and Expanding Subgrades

ARMORROAD UNIT SPECIFICATION

Block	Type	L	W	H	SF Coverage per Unit	Weight (lbs per Unit)	SF per Truck load
Mat	Closed	18.00	15.60	6.00	1.74	105-109	750

A-JACKS® CONCRETE ARMORING UNITS (CAU)

APPLICATIONS

- Bridge/Pier Scour
- Energy Dissipation
- Streambank/Toe Stabilization
- Shoreline
- Drop Structure
- Weirs
- Coastal Breakwater (Jetti)
- Habitat Creation

A-Jacks® provided bridge pier foundation scour protection to withstand Hurricane Sandy.

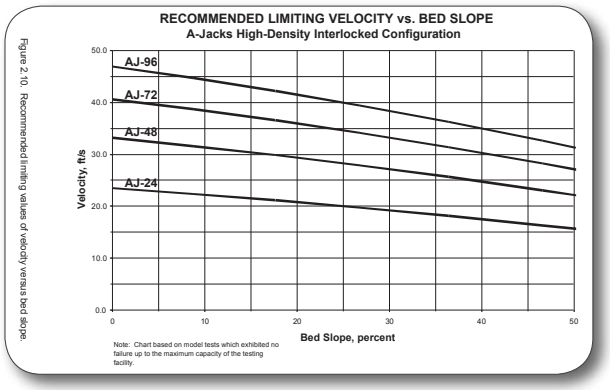
INSTALLATION

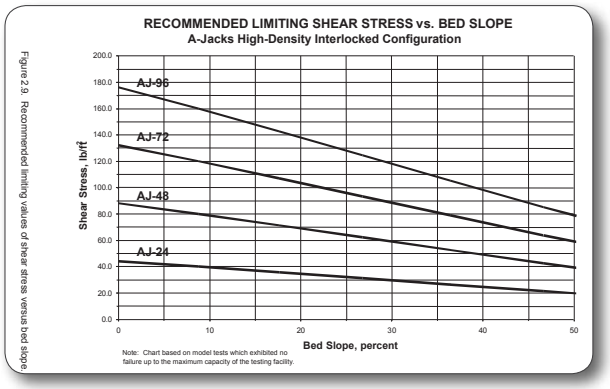
- Handplaced and Bundled Unit Methods
- Field Technicians Available for Pre-con and Installation
- Construction Versatility

A-JACKS® DESIGN CONSIDERATIONS

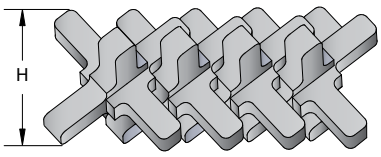
DESIGN

- A-Jacks® are recommended in FHWA HEC 23 with further guidance in Design Guideline 19.

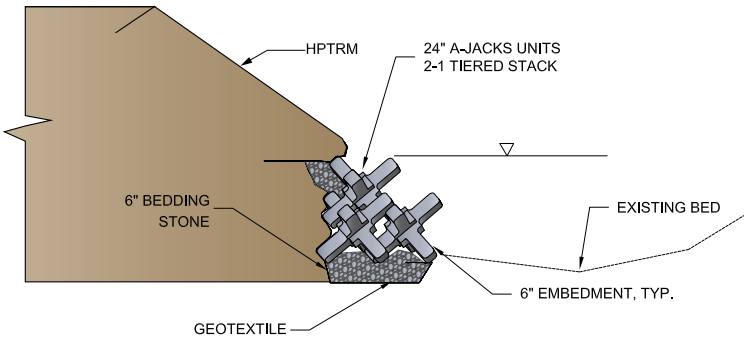




STANDARD DETAILS

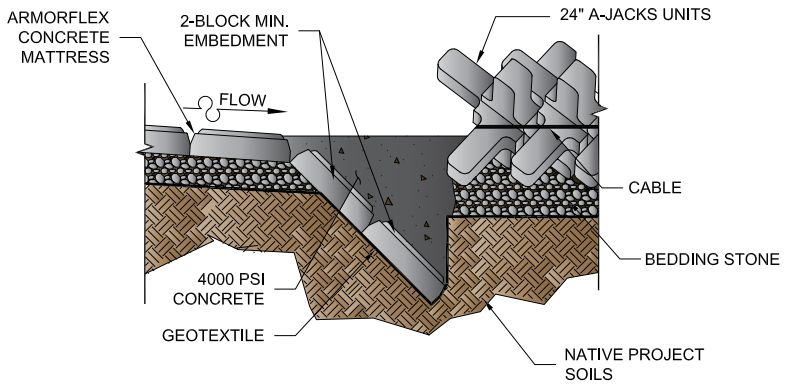


A-Jacks Placement Profile



A-Jacks Toe Stabilization Detail

A-JACKS UNIT SPECIFICATION			
A-Jacks	Coverage (SF)	Wt (lbs)	Standing Height (H) (ft)
AJ-24	1.0	78	1.5
AJ-48	4.0	629	3.0
AJ-72	9.0	2,120	4.5
AJ-96	16.0	5,022	6.0
AJ-120	25.0	9,699	7.5



A-Jacks Energy Dissipation Detail

HAND-PLACED SOLUTIONS

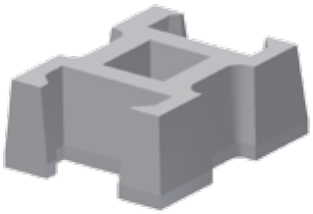
ADDITIONAL HAND-PLACED ACB SOLUTIONS

ARMORFLEX®

- Dam Overtopping
- Auxiliary Spillways
- Emergency Overflow
- Grade Transitions
- Retention Basins
- Shoreline Protection
- Drainage Ditch Lining
- Outfall Protection
- Bridge Abutment Protection

ARMORLOC®

- Auxiliary Spillways
- Emergency Overflow
- Grade Transitions
- Retention Basins
- Shoreline Protection
- Drainage Ditch Lining
- Outfall Protection
- Bridge Abutment Protection
- Walking Paths
- Auxiliary Parking
- Slope Paving



ARMORWEDGE®

- Dam Overtopping
- High Velocity Channels
- Primary and Secondary Spillways
- Down Chutes

PROJECT PARTNER. CONTECH.

OPTIONS & SUPPORT SPECIFIC TO YOUR PROJECT NEEDS

CONSIDERATIONS FOR ENGINEER OF RECORD

- Site Design
- Soil Borings
- Hydraulic Analysis
- Scour Analysis
- Scour Countermeasures
- Permitting
- Inspections

✺	Contech Support Available
☑	Engineer of Record May Provide

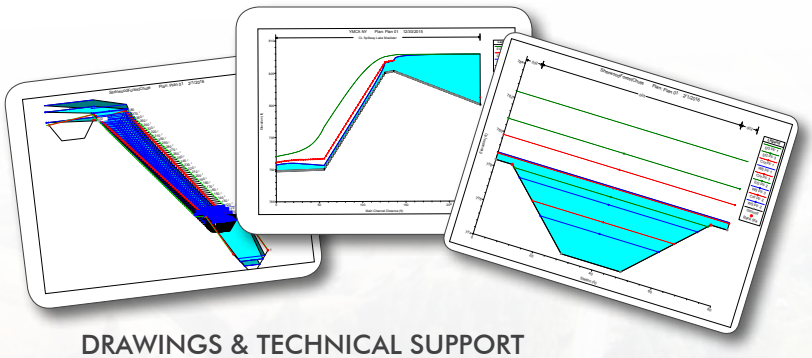
SOLUTION DEVELOPMENT & DESIGN SUPPORT

Limit Assessment	✺	☑
Hydraulic Analysis	✺	☑
HEC RAS Review	✺	
Factor of Safety Analysis	✺	
Block Selection	✺	
Engineer's Estimate	✺	
Proposal Drawings	✺	☑
Contract Drawings	✺	☑
Specifications	✺	☑
Approval Assistance	✺	☑
Staging and Layout	✺	☑
Fabrication Drawings	✺	

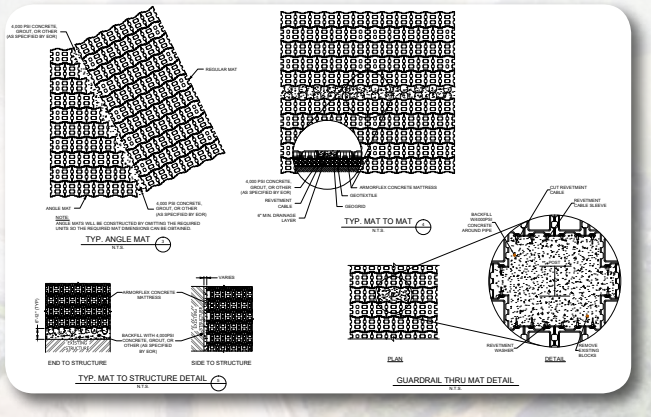
INSTALLATION SUPPORT

Preconstruction Meeting	✺
Logistics Coordination	✺
Onsite Installation Assistance	✺

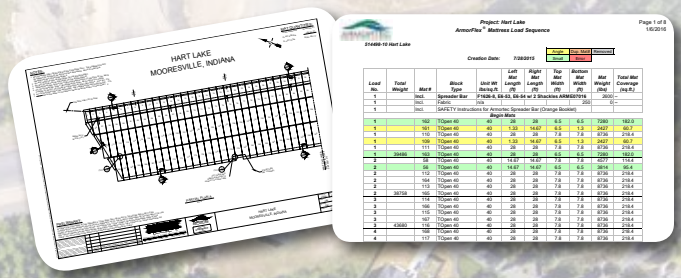
HEC RAS REVIEW



DRAWINGS & TECHNICAL SUPPORT



STAGING & LAYOUT



CONTECH®
ENGINEERED SOLUTIONS

COMPLETE SITE SOLUTIONS

STORMWATER SOLUTIONS

Helping to satisfy stormwater management requirements on land development projects

- Stormwater Treatment
- Detention/Infiltration
- Rainwater Harvesting
- Biofiltration/Bioretention

PIPE SOLUTIONS

Meeting project needs for durability, hydraulics, corrosion resistance, and stiffness

- Corrugated Metal Pipe (CMP)
- Steel Reinforced Polyethylene (SRPE)
- High Density Polyethylene (HDPE)
- Polyvinyl Chloride (PVC)

STRUCTURES SOLUTIONS

Providing innovative options and support for crossings, culverts, and bridges

- Plate, Precast & Truss bridges
- Hard Armor
- Retaining Walls
- Tunnel Liner Plate

ADDITIONAL SPECIALTY PRODUCTS

TURF REINFORCEMENT MATS

BIN WALL

LIGHT GAGE METRIC SHEETING

For more information, call one of Contech's Regional Offices located in the following cities:

Corporate Office - Ohio (Cincinnati)	**513-645-7000**
California (Roseville)	800-548-4667
Colorado (Denver)	720-587-2700
Florida (Orlando)	321-348-3520
Maine (Scarborough)	207-885-9830
Maryland (Baltimore)	410-740-8490
Oregon (Portland)	503-258-3180
Texas (Dallas)	972-590-2000

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ENGINEERED SOLUTIONS

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FSC

steel steel

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