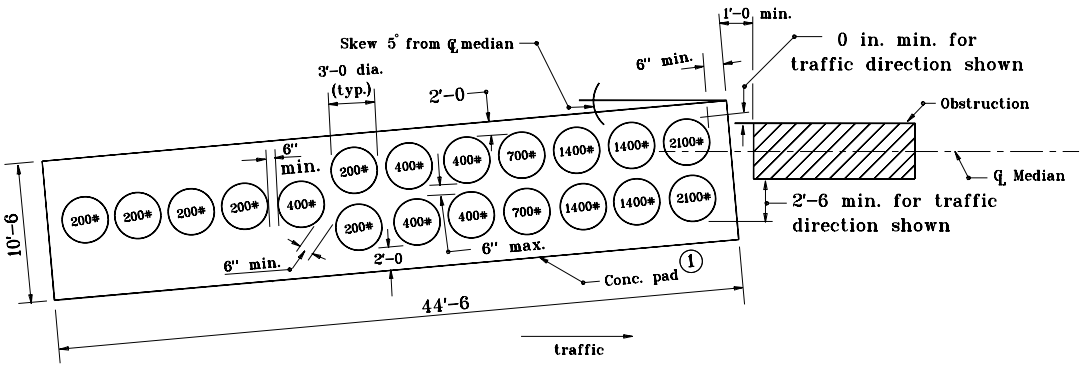
Standard TL-3 is 12 barrel array

INDOT uses the 19 barrel array for TL-3
INDOT uses the 11 barrel array for TL-2

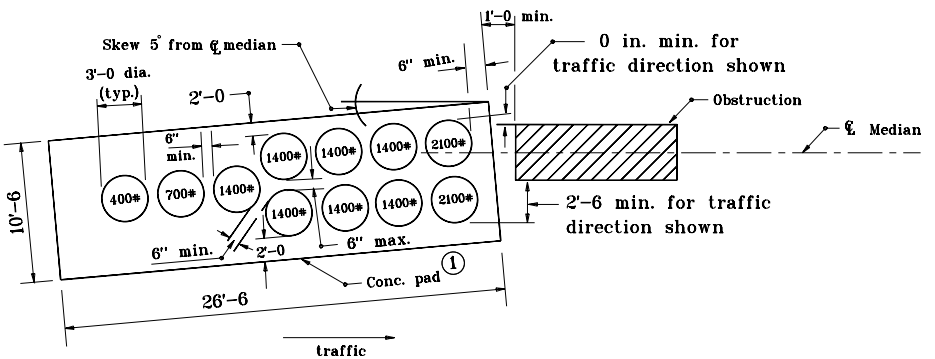


NOTES:

1. Concrete pad shall be 6" thick with welded wire fabric 6" x 6", W3/W3 or equivalent. A clearance of 2" shall be provided between all sides and top of concrete pad and welded wire fabric.
2. Appropriate impact attenuator Test Level shall be used to determine the concrete pad size and gravel barrel layout.
3. See Standard Drawings E 601-GAIA-01, 01A and 02 for grading details.
4. The details shown are for an impact attenuator type ED, gravel barrel array with a maximum obstruction width of 3'-0.

CONCRETE PAD PLAN IMPACT ATTENUATOR TYPE ED
GRAVEL BARREL ARRAY FOR TEST LEVEL 3

Crashgard 70 mph
Big Sandy 65 mph
Energite III 70 mph



CONCRETE PAD PLAN IMPACT ATTENUATOR TYPE ED
GRAVEL BARREL ARRAY FOR TEST LEVEL 2

Note: Big Sandy @ 40 mph
is 9 barrel config that matches
Crashgard and EnergiteIII @ 45 mph

Crashgard - no match
Big Sandy 45 mph
Energite III - no match

INDIANA DEPARTMENT OF TRANSPORTATION

IMPACT ATTENUATOR ED LAYOUT

MARCH 2002

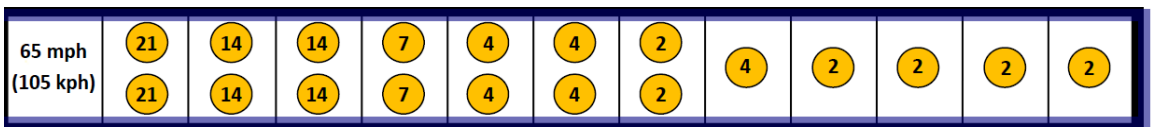
STANDARD DRAWING NO. **E 601-IAED-01**

RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER
DESIGN STANDARDS ENGINEER

/s/ Richard L. VanCleave 3-01-02
DESIGN STANDARDS ENGINEER DATE

/s/ Richard K. Smutzer 3-01-02
CHIEF HIGHWAY ENGINEER DATE

[CrashGuard] 70 mph matches TL-3 detail 601-IAED

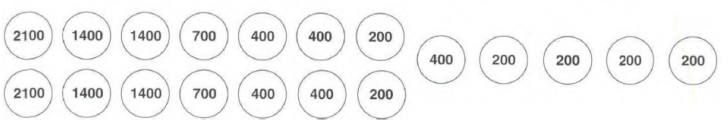


[Big Sandy] 65 mph matches TL-3 detail 601-IAED

Arrays Based on English Units (cont.)

DESIGN VELOCITY 70 mph (113 km/h)*

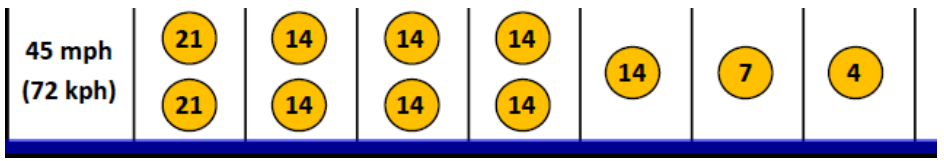
ROW	SAND MASS (lbs)	1800 lb vehicle EXIT VEL (mph)	1800 lb vehicle AVE G'S FOR ROW	1800 lb vehicle IMPULSE TIME (sec)	4500 lb vehicle EXIT VEL (mph)	4500 lb vehicle AVE G'S FOR ROW	4500 lb vehicle IMPULSE TIME (sec)
0		70.0			70.0		
1	200	63.0	10.4	0.03	67.1	4.5	0.03
2	200	56.7	8.4	0.03	64.2	4.2	0.03
3	200	51.1	6.8	0.04	61.5	3.8	0.03
4	200	45.9	5.5	0.04	58.9	3.5	0.03
5	400	37.6	7.8	0.05	54.0	6.0	0.04
6	400	30.8	5.2	0.06	49.6	5.1	0.04
7	800	21.3	5.5	0.08	42.1	7.7	0.04
8	800	14.7	2.6	0.11	35.8	5.5	0.05
9	1400	8.3	1.7	0.18	27.3	6.0	0.06
10	2800	3.2	.6	0.35	16.8	5.1	0.09
11	2800	1.3	.1	0.91	10.4	2.0	0.15
12	4200	.4	.0	2.48	5.4	.9	0.26



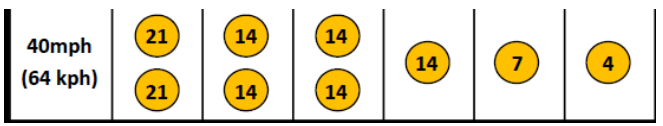
A 113 km/h (70 mph) design speed exceeds NCHRP Report 350, Test Level 3 impact conditions. Typical impacts into this array may not result in acceptable crash performance as described in NCHRP Report 350 relative to structural adequacy, occupant risk, and vehicle trajectory and should not be permitted.

[Energite III] 70 mph matches TL-3 detail 601-IAED

[CrashGard] 45 mph does not match TL-2 detail 601-IAED - only 9 barrel array, 4th row 1400# missing



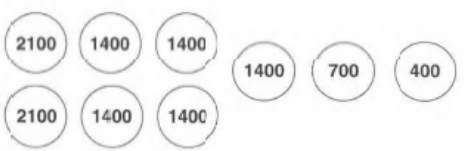
[Big Sandy] 45 mph matches TL-2 detail 601-IAED. Note: Configuration at 40 mph matches other systems at 45 mph



Arrays Based on English Units (cont.)

DESIGN VELOCITY 45 mph (72 km/h)

ROW	SAND MASS (lbs)	1800 lb vehicle EXIT VEL (mph)	1800 lb vehicle AVE G'S FOR ROW	1800 lb vehicle IMPULSE TIME (sec)	4500 lb vehicle EXIT VEL (mph)	4500 lb vehicle AVE G'S FOR ROW	4500 lb vehicle IMPULSE TIME (sec)
0		45.0			45.0		
1	400	36.8	7.5	0.05	41.3	3.5	0.05
2	700	26.5	7.3	0.06	35.8	4.8	0.05
3	1400	14.9	5.4	0.10	27.3	6.0	0.06
4	2800	5.8	2.1	0.20	16.8	5.1	0.09
5	2800	2.3	.3	0.50	10.4	2.0	0.15
6	4200	.7	.1	1.38	5.4	.9	0.26



[Energite III] 45 mph does not match TL-2 detail 601-IAED - only 9 barrel array, 4th row 1400# missing