 M1015/0040

## 01 54 23 – Temporary Scaffolding and Platforms

| | 01 54 23.75 Scaffolding Specialties | Crew | Daily Output | Labor-Hours | Unit | 2013 Bare Costs Material | Labor | Equipment | Total | Total Incl O&P |
|---|---|---|---|---|---|---|---|---|---|---|
| 3770 | Rent per month | | | | Ea. | 20 | | | 20 | 22 |
| 3790 | 22′ span, buy | | | | | 274 | | | 274 | 300 |
| 3795 | Rent per month | | | | | 30 | | | 30 | 33 |
| 3800 | Rolling ladders with handrails, 30″ wide, buy, 2 step | | | | | 204 | | | 204 | 225 |
| 4000 | 7 step | | | | | 635 | | | 635 | 700 |
| 4050 | 10 step | | | | | 880 | | | 880 | 965 |
| 4100 | Rolling towers, buy, 5′ wide, 7′ long, 10′ high | | | | | 1,075 | | | 1,075 | 1,200 |
| 4200 | For 5′ high added sections, to buy, add | | | | | 164 | | | 164 | 180 |
| 4300 | Complete incl. wheels, railings, outriggers, | | | | | | | | | |
| 4350 | 21′ high, to buy | | | | Ea. | 1,825 | | | 1,825 | 2,000 |
| 4400 | Rent/month = 5% of purchase cost | | | | ″ | 113 | | | 113 | 124 |

## 01 54 26 – Temporary Swing Staging

### 01 54 26.50 Swing Staging

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 0010 | **SWING STAGING**, 500 lb. cap., 2′ wide to 24′ long, hand operated | | | | | | | | | |
| 0020 | steel cable type, with 60′ cables, buy | | | | Ea. | 4,900 | | | 4,900 | 5,375 |
| 0030 | Rent per month | | | | ″ | 490 | | | 490 | 540 |
| 0600 | Lightweight (not for masons) 24′ long for 150′ height, | | | | | | | | | |
| 0610 | manual type, buy | | | | Ea. | 10,200 | | | 10,200 | 11,200 |
| 0620 | Rent per month | | | | | 1,025 | | | 1,025 | 1,125 |
| 0700 | Powered, electric or air, to 150′ high, buy | | | | | 25,600 | | | 25,600 | 28,200 |
| 0710 | Rent per month | | | | | 1,800 | | | 1,800 | 1,975 |
| 0780 | To 300′ high, buy | | | | | 26,000 | | | 26,000 | 28,600 |
| 0800 | Rent per month | | | | | 1,825 | | | 1,825 | 2,000 |
| 1000 | Bosun's chair or work basket 3′ x 3.5′, to 300′ high, electric, buy | | | | | 10,400 | | | 10,400 | 11,400 |
| 1010 | Rent per month | | | | | 730 | | | 730 | 800 |
| 2200 | Move swing staging (setup and remove) | E-4 | 2 | 16 | Move | | 810 | 72 | 882 | 1,525 |

## 01 54 36 – Equipment Mobilization

### 01 54 36.50 Mobilization

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 0010 | **MOBILIZATION** (Use line item again for demobilization) | | | | | | | | | |
| 0015 | Up to 25 mi. haul dist (50 mi. RT for mob/demob crew) | | | | | | | | | |
| 0020 | Dozer, loader, backhoe, excav., grader, paver, roller, 70 to 150 H.P. | B-34N | 4 | 2 | Ea. | | 73 | 142 | 215 | 269 |
| 0100 | Above 150 HP | B-34K | 3 | 2.667 | | | 97.50 | 320 | 417.50 | 505 |
| 0300 | Scraper, towed type (incl. tractor), 6 C.Y. capacity | | 3 | 2.667 | | | 97.50 | 320 | 417.50 | 505 |
| 0400 | 10 C.Y. | | 2.50 | 3.200 | | | 117 | 385 | 502 | 605 |
| 0600 | Self-propelled scraper, 15 C.Y. | | 2.50 | 3.200 | | | 117 | 385 | 502 | 605 |
| 0700 | 24 C.Y. | | 2 | 4 | | | 146 | 480 | 626 | 755 |
| 0900 | Shovel or dragline, 3/4 C.Y. | | 3.60 | 2.222 | | | 81.50 | 267 | 348.50 | 420 |
| 1000 | 1-1/2 C.Y. | | 3 | 2.667 | | | 97.50 | 320 | 417.50 | 505 |
| 1100 | Small equipment, placed in rear of, or towed by pickup truck | A-3A | 8 | 1 | | | 35.50 | 20.50 | 56 | 77.50 |
| 1150 | Equip up to 70 HP, on flatbed trailer behind pickup truck | A-3D | 4 | 2 | | | 71.50 | 69.50 | 141 | 186 |
| 2000 | Crane, truck-mounted, up to 75 ton, (driver only, one-way) | 1 Eqhv | 7.20 | 1.111 | | | 54 | | 54 | 82 |
| 2100 | Crane, truck-mounted, over 75 ton | A-3E | 2.50 | 6.400 | | | 273 | 66 | 339 | 490 |
| 2200 | Crawler-mounted, up to 75 ton | A-3F | 2 | 8 | | | 340 | 500 | 840 | 1,075 |
| 2300 | Over 75 ton | A-3G | 1.50 | 10.667 | | | 455 | 750 | 1,205 | 1,525 |
| 2500 | For each additional 5 miles haul distance, add | | | | | | 10% | 10% | | |
| 3000 | For large pieces of equipment, allow for assembly/knockdown | | | | | | | | | |
| 3001 | For mob/demob of vibrofloatation equip, see Section 31 45 13.10 | | | | | | | | | |
| 3100 | For mob/demob of micro-tunneling equip, see Section 33 05 23.19 | | | | | | | | | |
| 3200 | For mob/demob of pile driving equip, see Section 31 62 19.10 | | | | | | | | | |
| 3300 | For mob/demob of caisson drilling equip, see Section 31 63 26.13 | | | | | | | | | |

| | 31 23 16.43 Excavating, Large Volume Projects | Crew | Daily Output | Labor-Hours | Unit | 2013 Bare Costs Material | Labor | Equipment | Total | Total Incl O&P |
|---|---|---|---|---|---|---|---|---|---|---|
| 6000 | Self propelled scraper, 1/4 push dozer, average productivity | | | | | | | | | |
| 6100 | 31 C.Y., 1500' haul | B-33K | 2046 | .007 | B.C.Y. | | .30 | 2.05 | 2.35 | 2.71 |
| 6200 | 44 C.Y. | B-33H | 2640 | .005 | " | | .23 | 1.89 | 2.12 | 2.43 |
| | **31 23 16.46 Excavating, Bulk, Dozer** | | | | | | | | | |
| 0010 | **EXCAVATING, BULK, DOZER** | | | | | | | | | |
| 0011 | Open site | | | | | | | | | |
| 2000 | 80 H.P., 50' haul, sand & gravel | B-10L | 460 | .026 | B.C.Y. | | 1.13 | 1.04 | 2.17 | 2.87 |
| 2010 | Sandy clay & loam | | 440 | .027 | | | 1.19 | 1.09 | 2.28 | 3 |
| 2020 | Common earth | | 400 | .030 | | | 1.30 | 1.20 | 2.50 | 3.30 |
| 2040 | Clay | | 250 | .048 | | | 2.09 | 1.92 | 4.01 | 5.30 |
| 2200 | 150' haul, sand & gravel | | 230 | .052 | | | 2.27 | 2.09 | 4.36 | 5.75 |
| 2210 | Sandy clay & loam | | 220 | .055 | | | 2.37 | 2.18 | 4.55 | 6 |
| 2220 | Common earth | | 200 | .060 | | | 2.61 | 2.40 | 5.01 | 6.60 |
| 2240 | Clay | | 125 | .096 | | | 4.17 | 3.84 | 8.01 | 10.60 |
| 2400 | 300' haul, sand & gravel | | 120 | .100 | | | 4.35 | 4.01 | 8.36 | 11 |
| 2410 | Sandy clay & loam | | 115 | .104 | | | 4.54 | 4.18 | 8.72 | 11.50 |
| 2420 | Common earth | | 100 | .120 | | | 5.20 | 4.81 | 10.01 | 13.20 |
| 2440 | Clay | | 65 | .185 | | | 8.05 | 7.40 | 15.45 | 20.50 |
| 3000 | 105 H.P., 50' haul, sand & gravel | B-10W | 700 | .017 | | | .75 | .85 | 1.60 | 2.06 |
| 3010 | Sandy clay & loam | | 680 | .018 | | | .77 | .87 | 1.64 | 2.13 |
| 3020 | Common earth | | 610 | .020 | | | .86 | .97 | 1.83 | 2.37 |
| 3040 | Clay | | 385 | .031 | | | 1.36 | 1.54 | 2.90 | 3.75 |
| 3200 | 150' haul, sand & gravel | | 310 | .039 | | | 1.68 | 1.91 | 3.59 | 4.66 |
| 3210 | Sandy clay & loam | | 300 | .040 | | | 1.74 | 1.97 | 3.71 | 4.81 |
| 3220 | Common earth | | 270 | .044 | | | 1.93 | 2.19 | 4.12 | 5.35 |
| 3240 | Clay | | 170 | .071 | | | 3.07 | 3.49 | 6.56 | 8.50 |
| 3300 | 300' haul, sand & gravel | | 140 | .086 | | | 3.73 | 4.23 | 7.96 | 10.30 |
| 3310 | Sandy clay & loam | | 135 | .089 | | | 3.86 | 4.39 | 8.25 | 10.70 |
| 3320 | Common earth | | 120 | .100 | | | 4.35 | 4.94 | 9.29 | 12.05 |
| 3340 | Clay | | 100 | .120 | | | 5.20 | 5.90 | 11.10 | 14.40 |
| 4000 | 200 H.P., 50' haul, sand & gravel | B-10B | 1400 | .009 | | | .37 | .95 | 1.32 | 1.62 |
| 4010 | Sandy clay & loam | | 1360 | .009 | | | .38 | .98 | 1.36 | 1.66 |
| 4020 | Common earth | | 1230 | .010 | | | .42 | 1.08 | 1.50 | 1.83 |
| 4040 | Clay | | 770 | .016 | | | .68 | 1.73 | 2.41 | 2.93 |
| 4200 | 150' haul, sand & gravel | | 595 | .020 | | | .88 | 2.24 | 3.12 | 3.79 |
| 4210 | Sandy clay & loam | | 580 | .021 | | | .90 | 2.30 | 3.20 | 3.90 |
| 4220 | Common earth | | 516 | .023 | | | 1.01 | 2.58 | 3.59 | 4.38 |
| 4240 | Clay | | 325 | .037 | | | 1.61 | 4.10 | 5.71 | 6.95 |
| 4400 | 300' haul, sand & gravel | | 310 | .039 | | | 1.68 | 4.30 | 5.98 | 7.30 |
| 4410 | Sandy clay & loam | | 300 | .040 | | | 1.74 | 4.44 | 6.18 | 7.55 |
| 4420 | Common earth | | 270 | .044 | | | 1.93 | 4.94 | 6.87 | 8.40 |
| 4440 | Clay | | 170 | .071 | | | 3.07 | 7.85 | 10.92 | 13.30 |
| 5000 | 300 H.P., 50' haul, sand & gravel | B-10M | 1900 | .006 | | | .27 | .96 | 1.23 | 1.48 |
| 5010 | Sandy clay & loam | | 1850 | .006 | | | .28 | .99 | 1.27 | 1.52 |
| 5020 | Common earth | | 1650 | .007 | | | .32 | 1.11 | 1.43 | 1.70 |
| 5040 | Clay | | 1025 | .012 | | | .51 | 1.78 | 2.29 | 2.73 |
| 5200 | 150' haul, sand & gravel | | 920 | .013 | | | .57 | 1.99 | 2.56 | 3.05 |
| 5210 | Sandy clay & loam | | 895 | .013 | | | .58 | 2.04 | 2.62 | 3.14 |
| 5220 | Common earth | | 800 | .015 | | | .65 | 2.29 | 2.94 | 3.50 |
| 5240 | Clay | | 500 | .024 | | | 1.04 | 3.66 | 4.70 | 5.60 |
| 5400 | 300' haul, sand & gravel | | 470 | .026 | | | 1.11 | 3.89 | 5 | 5.95 |
| 5410 | Sandy clay & loam | | 455 | .026 | | | 1.15 | 4.02 | 5.17 | 6.15 |

| | 31 23 16.32 Ripping | Crew | Daily Output | Labor-Hours | Unit | Material | 2013 Bare Costs Labor | Equipment | Total | Total Incl O&P |
|---|---|---|---|---|---|---|---|---|---|---|
| 3050 | 300' haul | B-10B | 250 | .048 | B.C.Y. | | 2.09 | 5.35 | 7.44 | 9 |
| 3200 | 300 HP, 100' haul | B-10M | 1150 | .010 | | | .45 | 1.59 | 2.04 | 2.44 |
| 3250 | 300' haul | " | 400 | .030 | | | 1.30 | 4.57 | 5.87 | 7.05 |
| 3400 | 410 HP, 100' haul | B-10X | 1680 | .007 | | | .31 | 1.44 | 1.75 | 2.06 |
| 3450 | 300' haul | " | 600 | .020 | | | .87 | 4.04 | 4.91 | 5.75 |

## 31 23 16.42 Excavating, Bulk Bank Measure

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 0010 | **EXCAVATING, BULK BANK MEASURE** R312316-40 | | | | | | | | | |
| 0011 | Common earth piled | | | | | | | | | |
| 0020 | For loading onto trucks, add | | | | | | | | 15% | 15% |
| 0050 | For mobilization and demobilization, see Section 01 54 36.50 | | | | | | | | | |
| 0100 | For hauling, see Section 31 23 23.20 | | | | | | | | | |
| 0200 | Excavator, hydraulic, crawler mtd., 1 C.Y. cap. = 100 C.Y./hr. | B-12A | 800 | .020 | B.C.Y. | | .84 | 1.02 | 1.86 | 2.40 |
| 0250 | 1-1/2 C.Y. cap. = 125 C.Y./hr. | B-12B | 1000 | .016 | | | .67 | 1.04 | 1.71 | 2.17 |
| 0260 | 2 C.Y. cap. = 165 C.Y./hr. | B-12C | 1320 | .012 | | | .51 | 1.03 | 1.54 | 1.92 |
| 0300 | 3 C.Y. cap. = 260 C.Y./hr. | B-12D | 2080 | .008 | | | .32 | 1.18 | 1.50 | 1.79 |
| 0305 | 3-1/2 C.Y. cap. = 300 C.Y./hr. | " | 2400 | .007 | | | .28 | 1.02 | 1.30 | 1.56 |
| 0310 | Wheel mounted, 1/2 C.Y. cap. = 40 C.Y./hr. | B-12E | 320 | .050 | | | 2.11 | 1.25 | 3.36 | 4.59 |
| 0360 | 3/4 C.Y. cap. = 60 C.Y./hr. | B-12F | 480 | .033 | | | 1.40 | 1.45 | 2.85 | 3.73 |
| 0500 | Clamshell, 1/2 C.Y. cap. = 20 C.Y./hr. | B-12G | 160 | .100 | | | 4.21 | 4.42 | 8.63 | 11.25 |
| 0550 | 1 C.Y. cap. = 35 C.Y./hr. | B-12H | 280 | .057 | | | 2.41 | 4.27 | 6.68 | 8.35 |
| 0950 | Dragline, 1/2 C.Y. cap. = 30 C.Y./hr. | B-12I | 240 | .067 | | | 2.81 | 3.68 | 6.49 | 8.30 |
| 1000 | 3/4 C.Y. cap. = 35 C.Y./hr. | " | 280 | .057 | | | 2.41 | 3.15 | 5.56 | 7.15 |
| 1050 | 1-1/2 C.Y. cap. = 65 C.Y./hr. | B-12P | 520 | .031 | | | 1.30 | 2.28 | 3.58 | 4.48 |
| 1100 | 3 C.Y. cap. = 112 C.Y./hr. | B-12V | 900 | .018 | | | .75 | 1.68 | 2.43 | 2.98 |
| 1200 | Front end loader, track mtd., 1-1/2 C.Y. cap. = 70 C.Y./hr. | B-10N | 560 | .021 | | | .93 | .95 | 1.88 | 2.47 |
| 1250 | 2-1/2 C.Y. cap. = 95 C.Y./hr. | B-10O | 760 | .016 | | | .69 | 1.26 | 1.95 | 2.42 |
| 1300 | 3 C.Y. cap. = 130 C.Y./hr. | B-10P | 1040 | .012 | | | .50 | 1.14 | 1.64 | 2.02 |
| 1350 | 5 C.Y. cap. = 160 C.Y./hr. | B-10Q | 1280 | .009 | | | .41 | 1.20 | 1.61 | 1.94 |
| 1500 | Wheel mounted, 3/4 C.Y. cap. = 45 C.Y./hr. | B-10R | 360 | .033 | | | 1.45 | .82 | 2.27 | 3.10 |
| 1550 | 1-1/2 C.Y. cap. = 80 C.Y./hr. | B-10S | 640 | .019 | | | .82 | .59 | 1.41 | 1.88 |
| 1600 | 2-1/4 C.Y. cap. = 100 C.Y./hr. | B-10T | 800 | .015 | | | .65 | .66 | 1.31 | 1.71 |
| 1601 | 3 C.Y. cap. = 140 C.Y./hr. | " | 1120 | .011 | | | .47 | .47 | .94 | 1.23 |
| 1650 | 5 C.Y. cap. = 185 C.Y./hr. | B-10U | 1480 | .008 | | | .35 | .71 | 1.06 | 1.33 |
| 1800 | Hydraulic excavator, truck mtd. 1/2 C.Y. = 30 C.Y./hr. | B-12J | 240 | .067 | | | 2.81 | 3.68 | 6.49 | 8.35 |
| 1850 | 48 inch bucket, 1 C.Y. = 45 C.Y./hr. | B-12K | 360 | .044 | | | 1.87 | 2.81 | 4.68 | 5.95 |
| 3700 | Shovel, 1/2 C.Y. capacity = 55 C.Y./hr. | B-12L | 440 | .036 | | | 1.53 | 1.65 | 3.18 | 4.15 |
| 3750 | 3/4 C.Y. capacity = 85 C.Y./hr. | B-12M | 680 | .024 | | | .99 | 1.36 | 2.35 | 3.01 |
| 3800 | 1 C.Y. capacity = 120 C.Y./hr. | B-12N | 960 | .017 | | | .70 | 1.27 | 1.97 | 2.47 |
| 3850 | 1-1/2 C.Y. capacity = 160 C.Y./hr. | B-12O | 1280 | .013 | | | .53 | .96 | 1.49 | 1.86 |
| 3900 | 3 C.Y. cap. = 250 C.Y./hr. | B-12T | 2000 | .008 | | | .34 | .78 | 1.12 | 1.37 |
| 4000 | For soft soil or sand, deduct | | | | | | | | 15% | 15% |
| 4100 | For heavy soil or stiff clay, add | | | | | | | | 60% | 60% |
| 4200 | For wet excavation with clamshell or dragline, add | | | | | | | | 100% | 100% |
| 4250 | All other equipment, add | | | | | | | | 50% | 50% |
| 4400 | Clamshell in sheeting or cofferdam, minimum | B-12H | 160 | .100 | | | 4.21 | 7.45 | 11.66 | 14.60 |
| 4450 | Maximum | " | 60 | .267 | | | 11.25 | 19.90 | 31.15 | 39 |
| 5000 | Excavating, bulk bank measure, sandy clay & loam piled | | | | | | | | | |
| 5020 | For loading onto trucks, add | | | | | | | | 15% | 15% |
| 5100 | Excavator, hydraulic, crawler mtd., 1 C.Y. cap. = 120 C.Y./hr. | B-12A | 960 | .017 | B.C.Y. | | .70 | .85 | 1.55 | 2 |
| 5150 | 1-1/2 C.Y. cap. = 150 C.Y./hr. | B-12B | 1200 | .013 | | | .56 | .86 | 1.42 | 1.81 |
| 5300 | 2 C.Y. cap. = 195 C.Y./hr. | B-12C | 1560 | .010 | | | .43 | .87 | 1.30 | 1.62 |
| 5400 | 3 C.Y. cap. = 300 C.Y./hr. | B-12D | 2400 | .007 | | | .28 | 1.02 | 1.30 | 1.56 |

| | 31 23 16.30 Drilling and Blasting Rock | Crew | Daily Output | Labor-Hours | Unit | 2013 Bare Costs Material | Labor | Equipment | Total | Total Incl O&P |
|---|---|---|---|---|---|---|---|---|---|---|
| 2900 | Boulders, drilled, blasted | B-47 | 100 | .240 | B.C.Y. | 3.08 | 9.50 | 15.70 | 28.28 | 35 |
| 3100 | Jackhammer operators with foreman compressor, air tools | B-9 | 1 | 40 | Day | | 1,425 | 227 | 1,652 | 2,450 |
| 3300 | Track drill, compressor, operator and foreman | B-47 | 1 | 24 | " | | 950 | 1,575 | 2,525 | 3,175 |
| 3500 | Blasting caps | | | | Ea. | 6.20 | | | 6.20 | 6.80 |
| 3700 | Explosives | | | | | .44 | | | .44 | .48 |
| 3900 | Blasting mats, rent, for first day | | | | | 138 | | | 138 | 152 |
| 4000 | Per added day | | | | | 47 | | | 47 | 51.50 |
| 4200 | Preblast survey for 6 room house, individual lot, minimum | A-6 | 2.40 | 6.667 | | | 298 | 32.50 | 330.50 | 490 |
| 4300 | Maximum | " | 1.35 | 11.852 | | | 530 | 57.50 | 587.50 | 875 |
| 4500 | City block within zone of influence, minimum | A-8 | 25200 | .001 | S.F. | | .06 | | .06 | .09 |
| 4600 | Maximum | " | 15100 | .002 | " | | .10 | .01 | .11 | .16 |
| 5000 | Excavate and load boulders, less than 0.5 C.Y. | B-10T | 80 | .150 | B.C.Y. | | 6.50 | 6.60 | 13.10 | 17.15 |
| 5020 | 0.5 C.Y. to 1 C.Y. | B-10U | 100 | .120 | | | 5.20 | 10.55 | 15.75 | 19.50 |
| 5200 | Excavate and load blasted rock, 3 C.Y. power shovel | B-12T | 1530 | .010 | | | .44 | 1.02 | 1.46 | 1.79 |
| 5400 | Haul boulders, 25 Ton off-highway dump, 1 mile round trip | B-34E | 330 | .024 | | | .89 | 4 | 4.89 | 5.75 |
| 5420 | 2 mile round trip | | 275 | .029 | | | 1.06 | 4.80 | 5.86 | 6.95 |
| 5440 | 3 mile round trip | | 225 | .036 | | | 1.30 | 5.85 | 7.15 | 8.45 |
| 5460 | 4 mile round trip | | 200 | .040 | | | 1.46 | 6.60 | 8.06 | 9.50 |
| 5600 | Bury boulders on site, less than 0.5 C.Y., 300 H.P. dozer | | | | | | | | | |
| 5620 | 150' haul | B-10M | 310 | .039 | B.C.Y. | | 1.68 | 5.90 | 7.58 | 9.05 |
| 5640 | 300' haul | | 210 | .057 | | | 2.48 | 8.70 | 11.18 | 13.35 |
| 5800 | 0.5 to 1 C.Y., 300 H.P. dozer, 150' haul | | 300 | .040 | | | 1.74 | 6.10 | 7.84 | 9.35 |
| 5820 | 300' haul | | 200 | .060 | | | 2.61 | 9.15 | 11.76 | 14 |

| | 31 23 16.32 Ripping | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 0010 | **RIPPING** | | | | | | | | | |
| 0020 | Ripping, trap rock, soft, 300 HP dozer, ideal conditions | B-11S | 700 | .017 | B.C.Y. | | .75 | 2.73 | 3.48 | 4.13 |
| 1500 | Adverse conditions | | 660 | .018 | | | .79 | 2.90 | 3.69 | 4.38 |
| 1600 | Medium hard, 300 HP dozer, ideal conditons | | 600 | .020 | | | .87 | 3.19 | 4.06 | 4.82 |
| 1700 | Adverse conditions | | 540 | .022 | | | .97 | 3.54 | 4.51 | 5.35 |
| 2000 | Very hard, 410 HP dozer, ideal conditions | B-11T | 350 | .034 | | | 1.49 | 7.20 | 8.69 | 10.15 |
| 2100 | Adverse conditions | " | 310 | .039 | | | 1.68 | 8.10 | 9.78 | 11.50 |
| 2200 | Shale, soft, 300 HP dozer, ideal conditons | B-11S | 1500 | .008 | | | .35 | 1.27 | 1.62 | 1.93 |
| 2300 | Adverse conditions | " | 1350 | .009 | | | .39 | 1.42 | 1.81 | 2.15 |
| 2310 | Grader rear ripper, 180 H.P. ideal conditions | B-11J | 740 | .022 | | | .90 | 1.07 | 1.97 | 2.55 |
| 2320 | Adverse conditions | " | 630 | .025 | | | 1.05 | 1.26 | 2.31 | 2.99 |
| 2400 | Medium hard, 300 HP dozer, ideal conditons | B-11S | 1200 | .010 | | | .43 | 1.59 | 2.02 | 2.41 |
| 2500 | Adverse conditions | " | 1080 | .011 | | | .48 | 1.77 | 2.25 | 2.68 |
| 2510 | Grader rear ripper, 180 H.P. ideal conditions | B-11J | 625 | .026 | | | 1.06 | 1.27 | 2.33 | 3.02 |
| 2520 | Adverse conditions | " | 530 | .030 | | | 1.25 | 1.50 | 2.75 | 3.56 |
| 2600 | Very hard, 410 HP dozer, ideal conditons | B-11T | 800 | .015 | | | .65 | 3.15 | 3.80 | 4.45 |
| 2700 | Adverse conditions | " | 720 | .017 | | | .72 | 3.50 | 4.22 | 4.95 |
| 2800 | Till, boulder clay/hardpan, soft, 300 H.P. dozer, ideal conditions | B-11S | 7000 | .002 | | | .07 | .27 | .34 | .41 |
| 2810 | Adverse conditions | " | 6300 | .002 | | | .08 | .30 | .38 | .46 |
| 2815 | Grader rear ripper, 180 H.P. ideal conditions | B-11J | 1500 | .011 | | | .44 | .53 | .97 | 1.25 |
| 2816 | Adverse conditions | " | 1275 | .013 | | | .52 | .62 | 1.14 | 1.48 |
| 2820 | Medium hard, 300 H.P. dozer, ideal conditions | B-11S | 6000 | .002 | | | .09 | .32 | .41 | .48 |
| 2830 | Adverse conditions | " | 5400 | .002 | | | .10 | .35 | .45 | .54 |
| 2835 | Grader rear ripper, 180 H.P. ideal conditions | B-11J | 740 | .022 | | | .90 | 1.07 | 1.97 | 2.55 |
| 2836 | Adverse conditions | " | 630 | .025 | | | 1.05 | 1.26 | 2.31 | 2.99 |
| 2840 | Very hard, 410 H.P. dozer, ideal conditions | B-11T | 5000 | .002 | | | .10 | .50 | .60 | .71 |
| 2850 | Adverse conditions | " | 4500 | .003 | | | .12 | .56 | .68 | .80 |
| 3000 | Dozing ripped material, 200 HP, 100' haul | B-10B | 700 | .017 | | | .75 | 1.90 | 2.65 | 3.22 |

| | 31 23 16.16 Structural Excavation for Minor Structures | Crew | Daily Output | Labor-Hours | Unit | Material | 2013 Bare Costs Labor | Equipment | Total | Total Incl O&P |
|---|---|---|---|---|---|---|---|---|---|---|
| 1300 | Heavy soil or clay | 1 Clab | 8 | 1 | B.C.Y. | | 35.50 | | 35.50 | 54.50 |
| 1500 | For wet or muck hand excavation, add to above | | | | | | | | 50% | 50% |
| 1550 | Excavation rock by hand/air tool | B-9 | 3.40 | 11.765 | B.C.Y. | | 420 | 67 | 487 | 725 |
| 6000 | Machine excavation, for spread and mat footings, elevator pits, | | | | | | | | | |
| 6001 | and small building foundations | | | | | | | | | |
| 6030 | Common earth, hydraulic backhoe, 1/2 C.Y. bucket | B-12E | 55 | .291 | B.C.Y. | | 12.25 | 7.30 | 19.55 | 26.50 |
| 6035 | 3/4 C.Y. bucket | B-12F | 90 | .178 | | | 7.50 | 7.70 | 15.20 | 19.90 |
| 6040 | 1 C.Y. bucket | B-12A | 108 | .148 | | | 6.25 | 7.55 | 13.80 | 17.80 |
| 6050 | 1-1/2 C.Y. bucket | B-12B | 144 | .111 | | | 4.68 | 7.20 | 11.88 | 15.05 |
| 6060 | 2 C.Y. bucket | B-12C | 200 | .080 | | | 3.37 | 6.80 | 10.17 | 12.65 |
| 6070 | Sand and gravel, 3/4 C.Y. bucket | B-12F | 100 | .160 | | | 6.75 | 6.95 | 13.70 | 17.90 |
| 6080 | 1 C.Y. bucket | B-12A | 120 | .133 | | | 5.60 | 6.80 | 12.40 | 16.05 |
| 6090 | 1-1/2 C.Y. bucket | B-12B | 160 | .100 | | | 4.21 | 6.50 | 10.71 | 13.50 |
| 6100 | 2 C.Y. bucket | B-12C | 220 | .073 | | | 3.06 | 6.20 | 9.26 | 11.45 |
| 6110 | Clay, till, or blasted rock, 3/4 C.Y. bucket | B-12F | 80 | .200 | | | 8.45 | 8.70 | 17.15 | 22.50 |
| 6120 | 1 C.Y. bucket | B-12A | 95 | .168 | | | 7.10 | 8.60 | 15.70 | 20.50 |
| 6130 | 1-1/2 C.Y. bucket | B-12B | 130 | .123 | | | 5.20 | 7.95 | 13.15 | 16.65 |
| 6140 | 2 C.Y. bucket | B-12C | 175 | .091 | | | 3.85 | 7.80 | 11.65 | 14.40 |
| 6230 | Sandy clay & loam, hydraulic backhoe, 1/2 C.Y. bucket | B-12E | 60 | .267 | | | 11.25 | 6.65 | 17.90 | 24.50 |
| 6235 | 3/4 C.Y. bucket | B-12F | 98 | .163 | | | 6.90 | 7.10 | 14 | 18.30 |
| 6240 | 1 C.Y. bucket | B-12A | 116 | .138 | | | 5.80 | 7.05 | 12.85 | 16.60 |
| 6250 | 1-1/2 C.Y. bucket | B-12B | 156 | .103 | | | 4.32 | 6.65 | 10.97 | 13.90 |
| 9010 | For mobilization or demobilization, see Section 01 54 36.50 | | | | | | | | | |
| 9020 | For dewatering, see Section 31 23 19.20 | | | | | | | | | |
| 9022 | For larger structures, see Bulk Excavation, Section 31 23 16.42 | | | | | | | | | |
| 9024 | For loading onto trucks, add | | | | | | | | 15% | 15% |
| 9026 | For hauling, see Section 31 23 23.20 | | | | | | | | | |
| 9030 | For sheeting or soldier bms/lagging, see Section 31 52 16.10 | | | | | | | | | |
| 9040 | For trench excavation of strip ftgs, see Section 31 23 16.13 | | | | | | | | | |

| | 31 23 16.26 Rock Removal | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 0010 | **ROCK REMOVAL** | | | | | | | | | |
| 0015 | Drilling only rock, 2" hole for rock bolts | B-47 | 316 | .076 | L.F. | | 3.01 | 4.97 | 7.98 | 10.05 |
| 0800 | 2-1/2" hole for pre-splitting | | 600 | .040 | | | 1.58 | 2.62 | 4.20 | 5.30 |
| 4600 | Quarry operations, 2-1/2" to 3-1/2" diameter | | 715 | .034 | | | 1.33 | 2.20 | 3.53 | 4.45 |
| 4610 | 6" diameter drill holes | B-47A | 1350 | .018 | | | .76 | .89 | 1.65 | 2.14 |

| | 31 23 16.30 Drilling and Blasting Rock | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 0010 | **DRILLING AND BLASTING ROCK** | | | | | | | | | |
| 0020 | Rock, open face, under 1500 C.Y. | B-47 | 225 | .107 | B.C.Y. | 3.08 | 4.22 | 7 | 14.30 | 17.50 |
| 0100 | Over 1500 C.Y. | | 300 | .080 | | 3.08 | 3.17 | 5.25 | 11.50 | 14 |
| 0200 | Areas where blasting mats are required, under 1500 C.Y. | | 175 | .137 | | 3.08 | 5.45 | 8.95 | 17.48 | 21.50 |
| 0250 | Over 1500 C.Y. | | 250 | .096 | | 3.08 | 3.80 | 6.30 | 13.18 | 16.10 |
| 0300 | Bulk drilling and blasting, can vary greatly, average | | | | | | | | 9.50 | 12 |
| 0500 | Pits, average | | | | | | | | 25 | 31 |
| 1300 | Deep hole method, up to 1500 C.Y. | B-47 | 50 | .480 | | 3.08 | 19 | 31.50 | 53.58 | 67 |
| 1400 | Over 1500 C.Y. | | 66 | .364 | | 3.08 | 14.40 | 24 | 41.48 | 51.50 |
| 1900 | Restricted areas, up to 1500 C.Y. | | 13 | 1.846 | | 3.08 | 73 | 121 | 197.08 | 248 |
| 2000 | Over 1500 C.Y. | | 20 | 1.200 | | 3.08 | 47.50 | 78.50 | 129.08 | 162 |
| 2200 | Trenches, up to 1500 C.Y. | | 22 | 1.091 | | 8.95 | 43 | 71.50 | 123.45 | 154 |
| 2300 | Over 1500 C.Y. | | 26 | .923 | | 8.95 | 36.50 | 60.50 | 105.95 | 132 |
| 2500 | Pier holes, up to 1500 C.Y. | | 22 | 1.091 | | 3.08 | 43 | 71.50 | 117.58 | 148 |
| 2600 | Over 1500 C.Y. | | 31 | .774 | | 3.08 | 30.50 | 50.50 | 84.08 | 106 |
| 2800 | Boulders under 1/2 C.Y., loaded on truck, no hauling | B-100 | 80 | .150 | | | 6.50 | 11.95 | 18.45 | 23 |

# 31 37 Riprap

## 31 37 13 – Machined Riprap

| 31 37 13.10 Riprap and Rock Lining | Crew | Daily Output | Labor-Hours | Unit | 2013 Bare Costs Material | Labor | Equipment | Total | Total Incl O&P |
|---|---|---|---|---|---|---|---|---|---|
| 0010 **RIPRAP AND ROCK LINING** | | | | | | | | | |
| 0011 Random, broken stone | | | | | | | | | |
| 0100 Machine placed for slope protection | B-12G | 62 | .258 | L.C.Y. | 33.50 | 10.85 | 11.40 | 55.75 | 65.50 |
| 0110 3/8 to 1/4 C.Y. pieces, grouted | B-13 | 80 | .700 | S.Y. | 67 | 27 | 9.10 | 103.10 | 125 |
| 0200 18" minimum thickness, not grouted | " | 53 | 1.057 | " | 21 | 41 | 13.75 | 75.75 | 101 |
| 0300 Dumped, 50 lb. average | B-11A | 800 | .020 | Ton | 27.50 | .83 | 1.67 | 30 | 33.50 |
| 0350 100 lb. average | | 700 | .023 | | 27.50 | .95 | 1.90 | 30.35 | 34 |
| 0370 300 lb. average | | 600 | .027 | | 27.50 | 1.11 | 2.22 | 30.83 | 34.50 |

# 31 41 Shoring

## 31 41 13 – Timber Shoring

### 31 41 13.10 Building Shoring

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 0010 **BUILDING SHORING** | | | | | | | | | |
| 0020 Shoring, existing building, with timber, no salvage allowance | B-51 | 2.20 | 21.818 | M.B.F. | 660 | 780 | 121 | 1,561 | 2,075 |
| 1000 On cribbing with 35 ton screw jacks, per box and jack | " | 3.60 | 13.333 | Jack | 67 | 480 | 74 | 621 | 890 |
| 1100 Masonry openings in walls, see Section 02 41 19.16 | | | | | | | | | |

## 31 41 16 – Sheet Piling

### 31 41 16.10 Sheet Piling Systems

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 0010 **SHEET PILING SYSTEMS** | | | | | | | | | |
| 0020 Sheet piling steel, not incl. wales, 22 psf, 15' excav., left in place | B-40 | 10.81 | 5.920 | Ton | 1,500 | 265 | 350 | 2,115 | 2,450 |
| 0100 Drive, extract & salvage | | 6 | 10.667 | | 520 | 475 | 635 | 1,630 | 2,025 |
| 0300 20' deep excavation, 27 psf, left in place | | 12.95 | 4.942 | | 1,500 | 221 | 294 | 2,015 | 2,325 |
| 0400 Drive, extract & salvage | | 6.55 | 9.771 | | 520 | 435 | 580 | 1,535 | 1,900 |
| 0600 25' deep excavation, 38 psf, left in place | | 19 | 3.368 | | 1,500 | 151 | 200 | 1,851 | 2,100 |
| 0700 Drive, extract & salvage | | 10.50 | 6.095 | | 520 | 272 | 360 | 1,152 | 1,400 |
| 0900 40' deep excavation, 38 psf, left in place | | 21.20 | 3.019 | | 1,500 | 135 | 179 | 1,814 | 2,050 |
| 1000 Drive, extract & salvage | | 12.25 | 5.224 | | 520 | 234 | 310 | 1,064 | 1,275 |
| 1200 15' deep excavation, 22 psf, left in place | | 983 | .065 | S.F. | 17.30 | 2.91 | 3.87 | 24.08 | 28 |
| 1300 Drive, extract & salvage | | 545 | .117 | | 5.85 | 5.25 | 7 | 18.10 | 22.50 |
| 1500 20' deep excavation, 27 psf, left in place | | 960 | .067 | | 21.50 | 2.98 | 3.96 | 28.44 | 33 |
| 1600 Drive, extract & salvage | | 485 | .132 | | 7.60 | 5.90 | 7.85 | 21.35 | 26 |
| 1800 25' deep excavation, 38 psf, left in place | | 1000 | .064 | | 32 | 2.86 | 3.80 | 38.66 | 43.50 |
| 1900 Drive, extract & salvage | | 553 | .116 | | 10.40 | 5.15 | 6.90 | 22.45 | 27 |
| 2100 Rent steel sheet piling and wales, first month | | | | Ton | 298 | | | 298 | 330 |
| 2200 Per added month | | | | | 30 | | | 30 | 33 |
| 2300 Rental piling left in place, add to rental | | | | | 1,200 | | | 1,200 | 1,300 |
| 2500 Wales, connections & struts, 2/3 salvage | | | | | 475 | | | 475 | 525 |
| 2700 High strength piling, 50,000 psi, add | | | | | 69 | | | 69 | 75.50 |
| 2800 55,000 psi, add | | | | | 77.50 | | | 77.50 | 85.50 |
| 3000 Tie rod, not upset, 1-1/2" to 4" diameter with turnbuckle | | | | | 2,175 | | | 2,175 | 2,400 |
| 3100 No turnbuckle | | | | | 1,700 | | | 1,700 | 1,875 |
| 3300 Upset, 1-3/4" to 4" diameter with turnbuckle | | | | | 2,450 | | | 2,450 | 2,700 |
| 3400 No turnbuckle | | | | | 2,125 | | | 2,125 | 2,350 |
| 3600 Lightweight, 18" to 28" wide, 7 ga., 9.22 psf, and | | | | | | | | | |
| 3610 9 ga., 8.6 psf, minimum | | | | Lb. | .89 | | | .89 | .98 |
| 3700 Average | | | | | .97 | | | .97 | 1.07 |
| 3750 Maximum | | | | | 1.11 | | | 1.11 | 1.22 |
| 3900 Wood, solid sheeting, incl. wales, braces and spacers, | | | | | | | | | |
| 3910 drive, extract & salvage, 8' deep excavation | B-31 | 330 | .121 | S.F. | 1.65 | 4.57 | .65 | 6.87 | 9.55 |
| 4000 10' deep, 50 S.F./hr. in & 150 S.F./hr. out | | 300 | .133 | | 1.69 | 5.05 | .71 | 7.45 | 10.40 |

Bonding Calculations

| | | |
|---|---|---|
| Direct Costs | | |
| Subtotal Demolition and Removal | $0.00 | |
| Subtotal Backfilling and Grading | $0.00 | |
| Subtotal Revegetation | $0.00 | |
| Direct Costs | $0.00 | |
| Indirect Costs | | |
| Preformance Bond | $0.00 | 5.0% |
| Project Management Fee | $0.00 | 5.0% |
| Engineering Redesign | $0.00 | 2.5% |
| Main Office Expense | $0.00 | 6.8% |
| Project Management Fee | $0.00 | 2.5% |
| Subtotal Indirect Costs | $0.00 | 21.8% |
| Total Cost 2013 | $0.00 | |
| Number of years | | 5 |
| Escalation factor | | 0.015 |
| Escalation | $0.00 | |
| Reclamation Cost Escalated | $0.00 | |
| Bond Amount (rounded to nearest $1,000) 2018 Dollars | $0.00 | |
| Posted Bond | | |
| Difference Between Cost Estimate and Bond | $0.00 | |
| Percent Difference | | |