

# **ABBREVIATIONS**

Contents:

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<b>Abbreviations .....</b>	<b>A-3</b>
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**ABBREVIATIONS**

Common abbreviations used at NDOT are listed below:

AEB	Agreement Estimate Breakout
AP	Agreed Price
AWP	AASHTOWare Project Construction & Materials™
B/L	Bill of Ladings
BMP	Best Management Practices
Catg	Category (A.K.A. AEB)
CCC	Contract Compliance Clearance
CL	Center Line
CMP	Corrugated Metal Pipe
CP	Contract Payment
CPM	Critical Path Method
CTB	Cement Treated Base
DI	Drop Inlet
FA	Force Account
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
GASB	Governmental Accounting Standards Board
GM MS	Ground Mounted Metal Supports
GM TS	Ground Mounted Timber Supports
HMA	Hot Mix Asphalt
LOA	Letters of Authorization
LS	Lump Sum
LT	Left Line
MSDS	Material Safety Data Sheet
MEAS	Measure
MP	Milepost
PBS	Plantmix Bituminous Surface
PCCP	Portland Cement Concrete Pavement
PoDI	Projects of Divisional Interest (Federal)
Pmt	Payment (refers to Contractor progress payments)
Qty	Quantity
RCB	Reinforced Concrete Box
RCP	Reinforced Concrete Pipe
RE	Resident Engineer
RT	Right Line
Sig. Fig.	Significant Figure
SID	Special Improvement District
SWPPP	Stormwater Pollution Prevention Plan

UOM

Unit of Measure

# **CALCULATION FORMULAS**

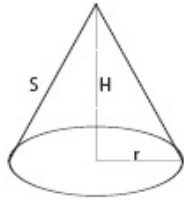
Contents:

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<b>Volume Calculations</b> .....	<b>B-3</b>
<b>Area Calculations</b> .....	<b>B-4</b>
<b>Calculation Sheet</b> .....	<b>B-5</b>



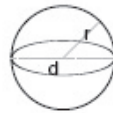
## VOLUME CALCULATIONS



Volume of a Cone

$$\text{CUFT} = 1/3 \pi r^2 H$$

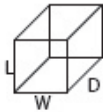
$$\text{CUYD} = [1/3 \pi r^2 H] / 27$$



Volume of a Sphere

$$\text{CUFT} = 4/3 \times \pi r^3$$

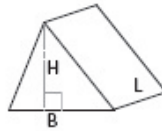
$$\text{CUYD} = (4/3 \times \pi r^3) / 27$$



Volume of a Cube

$$\text{CUFT} = L \times W \times D$$

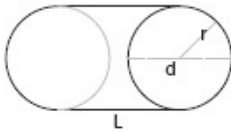
$$\text{CUYD} = (L \times W \times D) / 27$$



Volume of a Triangle

$$\text{CUFT} = 1/2 (B \times H \times L)$$

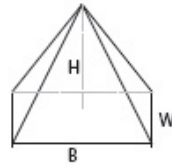
$$\text{CUYD} = [1/2(B \times H \times L)] / 27$$



Volume of a Cylinder / Pipe

$$\text{CUFT} = \pi r^2 \times L$$

$$\text{CUYD} = (\pi r^2 \times L) / 27$$



Volume of a Pyramid

$$\text{CUFT} = 1/3 (B \times W \times H)$$

$$\text{CUYD} = [1/3 (B \times W \times H)] / 27$$

The below calculations are only used when weights (computerized load tickets) cannot be obtained for an item paid by the ton.

Cubic Yards

Unit Weight\* = Pounds per Cubic Foot

Pounds per Cubic Foot X 27 = Pounds Per Cubic Yards

Length' X Width' X Depth' / 27 = Cubic Yards

Cubic Yards X Pounds per Cubic Yards = Pounds

Pounds/2000 = Tons

Cubic Foot

Unit Weight\* = Pounds per Cubic Foot

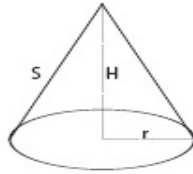
Length' X Width' X Depth' = Cubic Feet

Cubic Feet X Pounds per Cubic Foot = Pounds

Pounds/2000 = Tons

\*Unit Weight is based on theoretical or the actual unit weight for the material being placed.

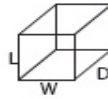
**AREA CALCULATIONS**



Area of a Cone

Surface Area (SQFT)=  
 $(\pi r S) + (\pi r^2)$

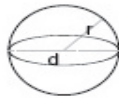
Surface Area (SQYD)=  
 $[(\pi r S) + (\pi r^2)] / 9$



Area of a Cube

Surface Area SQFT =  
 $(L \times W \times 2) + (L \times D \times 4)$

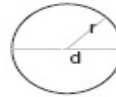
Surface Area SQYD =  
 $[(L \times W \times 2) + (L \times D \times 4)] / 9$



Area of a Sphere

Surface Area (SQFT) =  $4 \pi r^2$

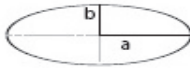
Surface Area (SQYD) =  $(4 \pi r^2) / 9$



Area of a Circle

SQFT =  $\pi r^2$

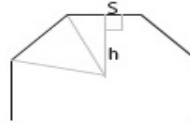
SQYD =  $\pi r^2 / 9$



Area of an Ellipse

SQFT =  $\pi a b$

SQYD =  $(\pi a b) / 9$



Area of a Polygons

SQFT =  $1/2 (N h S)$

SQYD =  $[1/2 (N h S)] / 9$

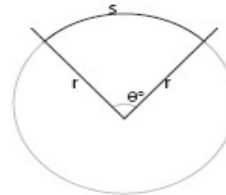
N = number of sides



Area of a Quadrant

SQFT =  $\frac{\pi r^2}{4}$

SQYD =  $[\frac{\pi r^2}{4}] / 9$

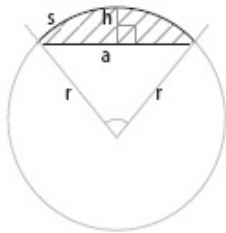


Sector of a Circle

SQFT =  $1/2 (\frac{\theta \pi}{180}) r^2$

SQYD =  $[1/2 (\frac{\theta \pi}{180}) r^2] / 9$

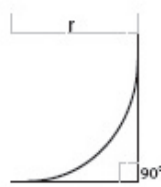




Segment of a Circle

$$SQFT = 1/2 [s r - a (r - h)]$$

$$SQYD = 1/2 [s r - a (r - h)] / 9$$



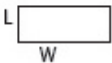
Area of a Spandrel

$$SQFT = 0.2146 r^2$$

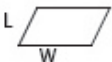
$$SQYD = (0.2146 r^2) / 9$$



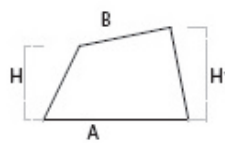
Area of a Square, Rectangle and Parallelogram



$$SQFT = L \times W$$



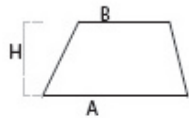
$$SQYD = L \times W / 9$$



Area of a Trapezium

$$SQFT = \frac{(H + H_1) \times (A + B)}{2}$$

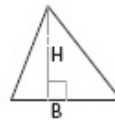
$$SQYD = \frac{[(H + H_1) \times (A + B)]}{2 \times 2} / 9$$



Area of a Trapezoid

$$SQFT = 1/2 H \times (A + B)$$

$$SQYD = [1/2 H \times (A + B)] / 9$$



Area of a Triangle

$$SQFT = 1/2 (B \times H)$$

$$SQYD = [1/2 (B \times H)] / 9$$

Proration Example:

Pipe plan = 40 LFT

Pipe field measure = 45 LF

Structure Excavation plan = 120 CUYD

$45 \div 40 = 1.125 \times 120 = 135$  CUYD new quantity for structure excavation

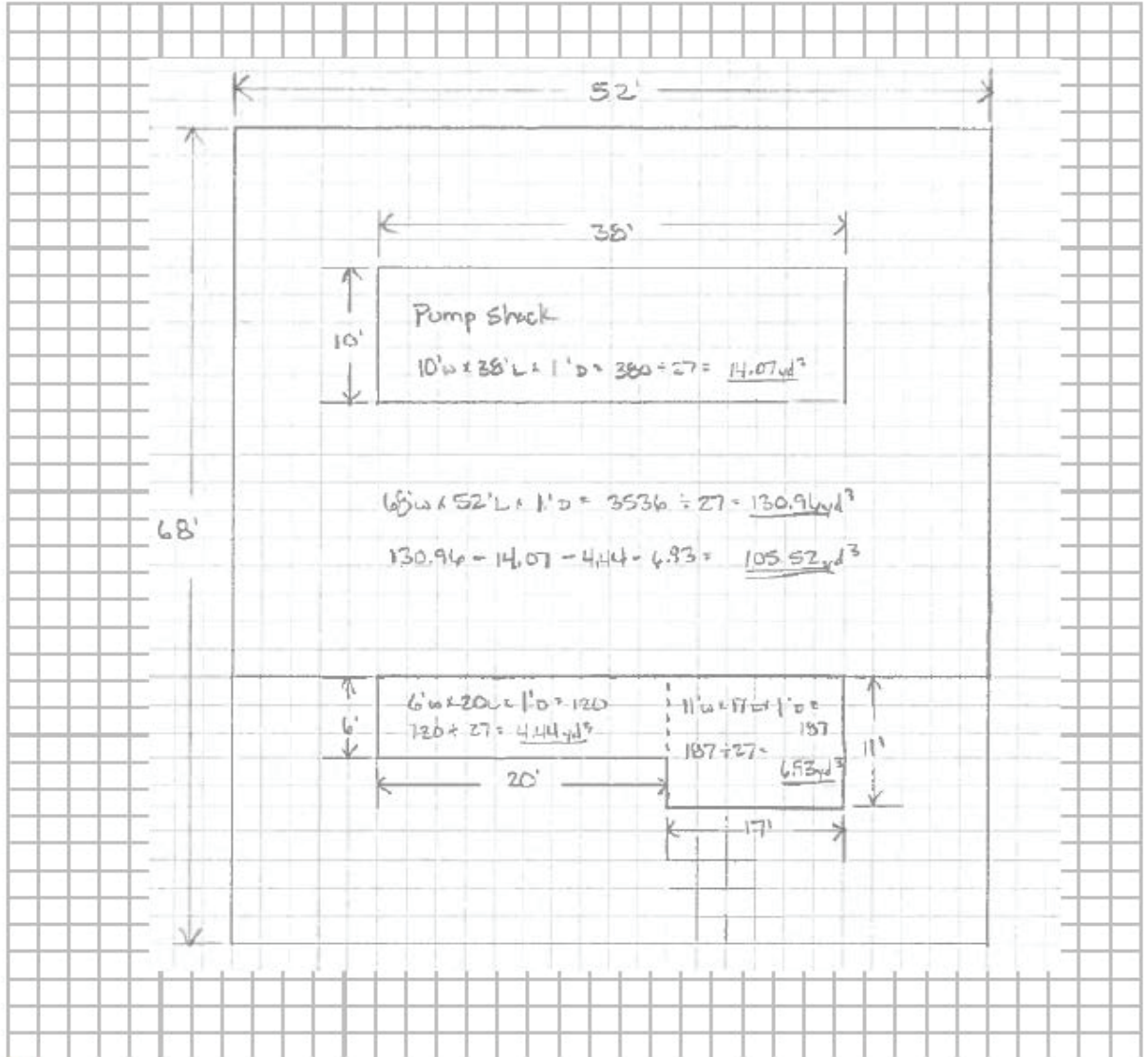
## CALCULATION SHEET

Calculations made for determining pay quantities (final or estimated) for contract items requiring computations too extensive to place in the remarks section in an DWR, will be made on a Calculation Sheet (Figure B-1). These sheets will be scanned and saved in the Contract Files, Division No. 7 - Construction Pay Estimate and Related Data, 7.10 DWR Calc Sheets directory.

Name these sheets using this standard naming convention; YYYY-MM-DD.DWR.inspector initials (i.e. 2016-06-07.DWR.ACR.pdf).

STATE OF NEVADA  
DEPARTMENT OF TRANSPORTATION  
**CALCULATION SHEET**

Contract No: 3583 Insp. Name: A. Rogers Checked By: KMM IDR Date: 10/30/16  
 Description: Remove composite surface  
 Location: District II Maintenance yard - Diesel fuel island



NDOT  
040-034  
12-2016

Figure B-1: Calculation Sheet

# **FORMS LIST AND DISTRIBUTION**

Contents:

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<b>Construction Crew Forms .....</b>	<b>C-3</b>
<b>Independent Assurance Forms .....</b>	<b>C-6</b>



## CONSTRUCTION CREW FORMS

1 = Resident Engineer, 2 = District, 3 = Construction, 4 = Materials, 5 = Contractor

O = Originals, X = Copies

FORM NO	REV DATE	DESCRIPTION	1	2	3	4	5
018-001	01-20	Construction Site Stormwater Inspection Form (SharePoint Only)	O				X
020-016	02-10	Transmittal for Asphalt Samples (Stockroom)	X			O	
020-017	03-08	Transmittal for Concrete Samples & Certifications (Stockroom)	X			O	
020-018	07-12	Transmittal for Test Samples (Stockroom)	X			O	
040-000	08-18	Vehicle Weight Limit (SharePoint Only)	O		X		
040-003	07-14	Nuclear Gauge/Sand Cone Check Test (Proctor) (SharePoint Only)	X	X	O		X
040-006	11-07	Field Sand Equivalent Worksheet (SharePoint Only)	X	X	O		X
040-007	07-14	Nuclear Compaction Report for Soils and Aggs. (Proctor) (SharePoint Only)	X	X	O		X
040-008	<b>04-21</b>	Daily Costs of Force Account w Standby (SharePoint Only)	O				X
040-009	08-16	Daily Record of Scale Weights (SharePoint Only)	O				X
040-010	02-09	Daily Report of Tests Made in Field (SharePoint Only)	X	X	O		X
040-011	10-17	Daily Plant Report for Asphalt Mixtures (SharePoint Only)	X	X	O		X
040-012	03-06	Contractor Traffic Log (SharePoint Only)	O				X
040-013	11-10	Field Material Sieve Sheet (SharePoint Only)	X	X	O		X
040-014	10-16	Field LL/PI Worksheet (SharePoint Only)	X	X	O		X
040-015	08-16	Request for Payment for Materials on Hand (SharePoint Only)	X		O		
040-016	11-10	Report of Tests of PCCP (SharePoint Only)	X	X	O	X	X
040-017	09-20	Nuclear Thin Layer Compaction Report (SharePoint Only)	X	X	O		X
040-017A	11-19	Nuclear Thin Lift Correction Factor Worksheet (SharePoint Only)	X	X	O		X
040-017B	09-13	Bulk Gravity and Density of Compacted PBS (SharePoint Only)	X	X	O		X
040-018	08-06	Compaction Report for PBS Drilled Core Data (SharePoint Only)	X	X	O		X
040-019	06-05	Dowel Bar Placement Worksheet (SharePoint Only)	X	X	O	X	X
040-020	01-19	Inventory of Standard Testing Equipment - Construction Field Labs (SharePoint Only)	X	X	O		

# C

# FORMS LIST AND DISTRIBUTION

1 = Resident Engineer, 2 = District, 3 = Construction, 4 = Materials, 5 = Contractor							
O = Originals, X = Copies							
FORM NO	REV DATE	DESCRIPTION	1	2	3	4	5
040-020A	10-16	Construction Emulsion Trailer Inventory (SharePoint Only)	X	X	O		
040-021	08-20	Striping Paint Thickness Report (SharePoint Only)	X	X	O		X
040-023A	11-08	Absorption and Specific Gravity for Fine Aggs. (SharePoint Only)	X	X	O		X
040-023B	02-09	Absorption and Specific Gravity for Coarse Aggs. (SharePoint Only)	X	X	O		X
040-024	04-05	Concrete Evaporation Rate and Cure Monitoring (SharePoint Only)	X	X	O		X
040-025	07-04	Transit Mix Concrete Delivery (Stockroom)	O		X		X
040-026	07-14	Nuclear Gauge / Sand Cone Correlation (Proctor) (SharePoint Only)	X	X	O		X
040-027	06-05	Rock Compaction Inspection Report (SharePoint Only)	X	X	O		X
040-030	08-10	Theoretical Maximum Specific Gravity of Bituminous Paving Mixtures (Field Method) (SharePoint Only)	X	X	O		X
040-031	05-15	Nuc Gauge Transfer and Packing Form (SharePoint Only)	X		O		
040-032	07-07	Emulsion Viscosity Worksheet (chip seal & cold-recycle) (SharePoint Only)	X	X	O		X
040-033	02-16	Contractor's Force Account Equipment List (SharePoint Only)	O				
040-034	12-16	Calculation Sheet (SharePoint Only)	O				
040-035	10-09	Report of Field Tests of Coarse and Fine Aggregate for Concrete (SharePoint Only)	X	X	O		X
040-038	03-16	Hotplant Calibration Sheet (SharePoint Only)	X	X	O		X
040-040	02-16	Equipment Watch Recap Sheet (SharePoint Only)	O				
040-041	03-05	Retroreflectivity Measurements (SharePoint Only)	X	X	O		X
040-042	02-16	Weekly Trainee Report (SharePoint Only)	O		X		
040-044	03-19	Contractor Past Performance Rating (CPPR) (SharePoint Only)	X	X	O		
040-045	07-07	Daily Hotplant Worksheet (SharePoint Only)	X		O		
040-046	11-05	Monthly Summary of Plant Establishment (SharePoint Only)	X	X	O		X
040-047	07-07	Pavement Marking Film Adhesion Test (SharePoint Only)	X	X	O		X
040-048	12-05	Nuc Gauge Worksheet for Control Strip Density (SharePoint Only)	X	X	O		X
040-049	09-96	Haul Ticket (Stockroom)	O				

# FORMS LIST AND DISTRIBUTION

C

1 = Resident Engineer, 2 = District, 3 = Construction, 4 = Materials, 5 = Contractor

O = Originals, X = Copies

FORM NO	REV DATE	DESCRIPTION	1	2	3	4	5
040-050	11-10	Fld. Material Sieve/Bit. Ratio/Ignition Method (SharePoint Only)	X	X	O		X
040-051	01-97	Field Report for CTB Strength Tests (SharePoint Only)	X	X	O		X
040-052	03-97	Daily Report for CTB Mixture (SharePoint Only)	X	X	O		X
040-053	10-20	Report of Calibration Factor (Including Weekly Checks) Using the Ignition Furnace Method (SharePoint Only)	X	X	O		X
040-056B	05-15	Workzone Traffic Control Checklist (SharePoint Only)	X		O		X
040-058	11-16	Foundation Piling Driving Record (SharePoint Only)	X	X	O	X	X
040-059	11-16	Continuous Pile Driving Record (SharePoint Only)	X	X	O	X	X
040-060	01-17	Drilled Shaft Inspection Report (SharePoint Only)	O			X	X
040-061	02-17	Drilled Shaft Drilling Slurry Inspection Report (SharePoint Only)	O			X	X
040-063	10-20	Pull-Off Test for Polymer Concrete (SharePoint Only)	X	X	O	X	X
040-064	09-03	Pavement Core Record (SharePoint Only)	X	X	O		X
040-067	05-09	Water Volume Calculations for Sand Cone and Meas. Vessel (Hat) (SharePoint Only)	X	X	O		X
040-068	03-09	Sand Density Calculation (SharePoint Only)	X	X	O		X
040-069	08-20	Moisture-Density Determination, Compaction Report (SharePoint Only)	X	X	O		X
040-076	06-13	Acceptance Testing Summary Sheet (Hdqtrs)	X	X	O	X	
040-077	08-16	Liquidated Damages for Failing Asphalts (SharePoint Only)	O		X		X
040-078	01-14	Concrete Field Summary Report (SharePoint Only)	X	X	O		X
040-081	10-16	Calibration of Unit Weight Measure	X	X	O		X
040-084	07-20	Ride Pay Adjustment Calc. Sheet (SharePoint Only)	X		O		
040-087	10-08	Material Deposit Usage Report (SharePoint Only)	X	X	O	X	
040-088	06-16	Daily Biological Field Report (SharePoint Only)	X		O		X
040-090	04-19	Dispute Process Documentation	X	X	O	X	X
070-052	03-93	NDOT Transmittal (Stockroom)					

## INDEPENDENT ASSURANCE FORMS

1 = Resident Engineer, 2 = District, 3 = Construction, 4 = Materials, 5 = Contractor

O = Originals, X = Copies

FORM NO	REV DATE	DESCRIPTION	1	2	3	4	5
040-005	10-16	Audit Report Form for Compaction Curve (SharePoint Only)	X	X	O		X
040-022	11-12	Field Lab Inspection Report (SharePoint Only)	X	X	O		X
040-055	10-20	Field Lab Safety Equipment Inspection (SharePoint only)	X	X	O		X
040-070	11-12	Audit Report Form for Concrete Aggregates (SharePoint Only)	X	X	O		X
040-071	11-12	Auditor's Report of Concrete Tests (SharePoint Only)	X	X	O		X
040-072	11-12	Report Form for Two Way Audits (SharePoint Only)	X	X	O		X
040-074	10-16	Equipment Repair Form Utilized by the I.A. Lab	X	X	O		
040-079	11-12	Visual Audit Report Form (SharePoint Only)	X	X	O		X
040-085	08-03	Field Lab Inspection (SharePoint Only)	X		O		
040-086	08-03	Nuclear Personnel Inspection (SharePoint Only)	X		O		
040-089	11-12	Visual Audit for Nuclear Density Gauge - Plantmix (SharePoint Only)	X	X	O		X
040-089A	11-12	Visual Audit for Nuclear Density Gauge - Soils (SharePoint Only)	X	X	O		X