
FERRIS STATE UNIVERSITY

Institute for Construction Education and
Training



FERRIS COURSES

MDOT Aggregate Division Contract:

- Michigan Certified Aggregate Technician Sampling
- Michigan Certified Aggregate Technician (MCAT) Level 1
- Michigan Certified Aggregate Technician (MCAT) Level 2

MDOT Construction Field Services Contract:

- Nuclear Density Technician

MDOT Asphalt Division Contract:

- Bituminous Asphalt Sampling Certification for Local Agencies
 - Bituminous Asphalt Certification for Local Agencies Level 1
 - QCQA Certification (State Mixes)
 - MDOT Field Paving Operations Certification
-

PRIMARY LOCATIONS



Ferris State
University – Big
Rapids

Larence
Technical
University –
Southfield

MDOT Saginaw
Office

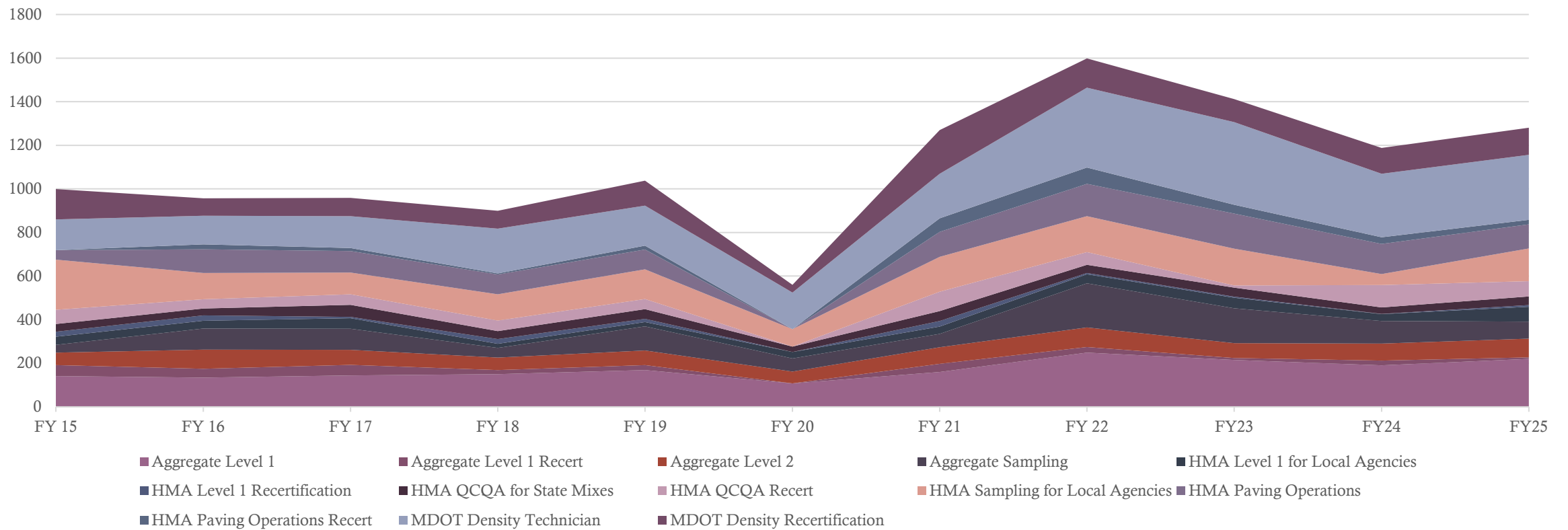
Michigan
Technical
University –
Houghton

Lansing
Community
College

Countless others
based on demand

ENROLLMENT (VISUAL)

ICET Student Enrollment Numbers



ENROLLMENT (DATA)

	<u>ICET Student Enrollment Numbers</u>											AVERAGE	3rd Quartile	MAX
	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25			
	FY 15	FY 16	FY 17	FY 18	FY 19	FY 20	FY 21	FY 22	FY23	FY24	FY25			
Aggregate Level 1	141	134	144	150	169	108	160	249	215	190	220	171	203	249
Aggregate Level 1 Recert	50	41	48	19	22	0	37	25	9	22	7	25	39	50
Aggregate Level 2	58	88	70	57	68	54	76	90	68	78	86	72	82	90
Aggregate Sampling	35	96	96	44	110	60	62	203	160	104	78	95	107	203
HMA Level 1 for Local Agencies	38	36	49	19	20	30	33	41	49	32	68	38	45	68
HMA Level 1 Recertification	23	25	6	22	15	0	26	6	5	1	8	12	23	26
HMA QCQA for State Mixes	35	31	55	37	44	24	45	38	41	29	40	38	43	55
HMA QCQA Recert	65	43	48	48	47	0	89	58	10	103	70	53	68	103
HMA Sampling for Local Agencies	230	120	100	120	136	80	160	165	169	50	150	135	163	230
HMA Paving Operations	44	109	99	91	91	0	115	148	161	139	110	101	127	161
HMA Paving Operations Recert	0	23	14	5	18	0	62	75	40	30	21	26	35	75
MDOT Density Technician	141	131	146	206	183	168	205	367	380	292	298	229	295	380
MDOT Density Recertification	139	80	84	82	115	36	200	134	105	118	125	111	130	200
TOTAL	999	957	959	900	1038	560	1270	1599	1412	1188	1281	1106	1276	1599



Ferris State ICET

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Videos



Aggregate - MDOT Loss-by-Wash Procedure

439 views · 9 months ago



MDOT - HMA Sampling From Inside a Hauling Unit

305 views · 2 years ago



MDOT HMA Sampling - Plates and Mini Stockpile

443 views · 2 years ago



Density Training - Video: T180 Test

6.4K views · 4 years ago



Density Training - Video: One Point T-99 Test

12K views · 4 years ago



Density Training - Video: MDOT One Point Cone

5.2K views · 4 years ago

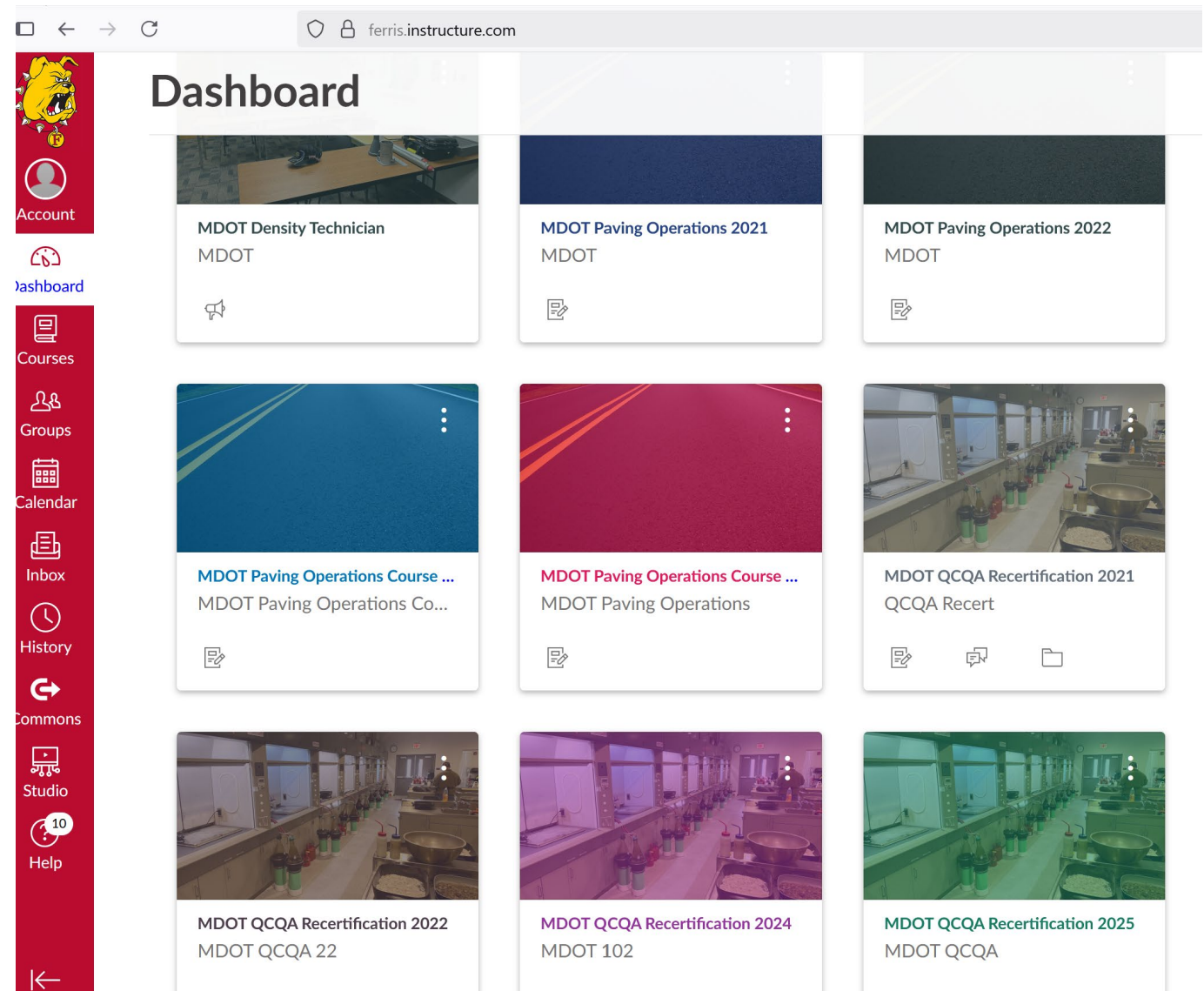


Density Training - Video: In-Place Density

48K views · 4 years ago

E-LEARNING

- Canvas Dashboard
- Used for virtual recertification and non-lab-based lectures



ONLINE COMPONENTS – QUIZZES AND VIDEOS

MDOT Paving Operations > Modules > Watch Video 1 > Video 1 Link

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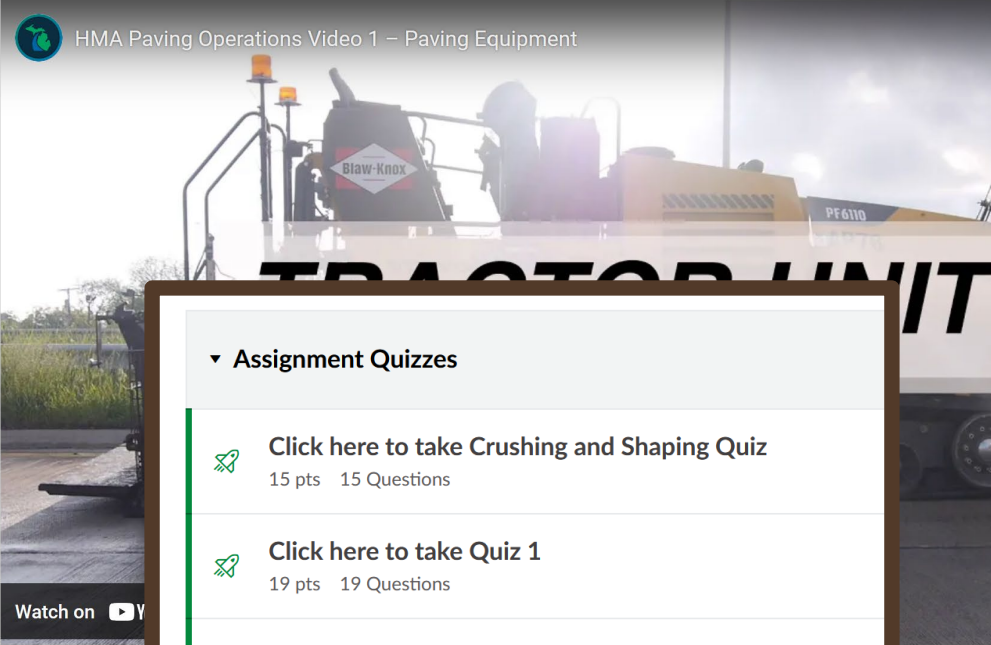
Item Banks

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New Analytics

Video 1 Link

HMA Paving Operations Video 1 – Paving Equipment



Watch on

Assignment Quizzes

Click here to take Crushing and Shaping Quiz

15 pts 15 Questions

Click here to take Quiz 1

19 pts 19 Questions

Click here to take Quiz 2

19 pts 19 Questions

Click here to take Quiz 3

16 pts 16 Questions

Click here to take Quiz 4

16 pts 16 Questions

Click here to take Rubbilizing Quiz

Started: Jul 16 at 3:28pm

Quiz Instructions

The correct answer will be one or more of the given choices.

A passing grade of at least 70% is required to complete this quiz.

Question 1

1 pts

Before placing bond coat, contractors are required to remove loose material from joints and cracks by the use of:

☐ manual and/or power brooms

☐ water - under pressure - and strong detergent

☐ the distributor's spray wand

☐ compressed air

☐ suction (power vacuum)

Question 2

1 pts

In urban areas, contractors should use _____ to avoid raising clouds of dust and throwing debris against building and parked cars.

☐ wet mops

☐ vacuum - type sweepers

☐ rotary power brooms

COURSE CONTENT – LECTURE AND LAB

Form Sections (continued)

Lower section of the form is where you generate your **TARGET MAX DENSITY** for each new material

Column A: Test number (corresponds with the test number above)

Column B: Moisture % of material at time of MD determination

Column C: Volume or size of the mold used (remember $DENSITY = MASS / VOLUME$)

Column D & E: Measured masses (these are the measured values, all other columns are calculated from these)

DETERMINATION OF MAXIMUM DENSITY (SOIL & HMA)									
TEST NO.	MOISTURE %	VOLUME OF MOLD CU. FT.	WET SOIL + MOLD g	MOLD g	WET SOIL g	WET SOIL lbs	COMPACTED SOIL WET PCF	MAX DENSITY PCF	OPTIMUM MOISTURE %
A	B	C	D	E	F	G	H	I	J
1	5.3	0.0446	4,860	2,007	2,853	6.29	141.0	137.3	7.7
4									
9									

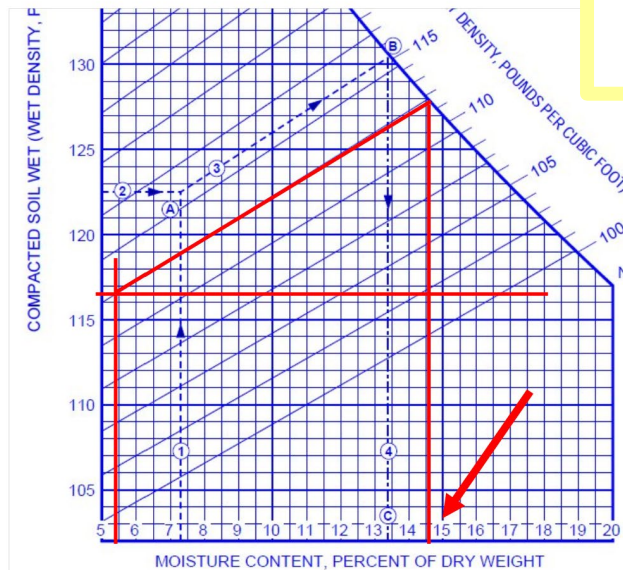
Homework Overview

Find Column 'J'

Step 3: find optimum moisture...

111.6 PCF @ 14.6%
Optimum Moisture

Record values on form!



Initial Wet Wt:
542 g

A 7:30am:

537.0 g

B 8:00am:

527.6 g

C 8:30am:

527.4 g

Michigan Department of Transportation 1901(05/2023)

MECHANICAL ANALYSIS REPORT

File 303

JOB NUMBER: 46269A

CONTROL SECTION: NH 78015

DATE: 07/07/2024

MATERIAL: Fine Aggregate

SAMPLED FROM: Ministockpile

SPECIFICATION: 2NS

PRODUCER: ABC Gravel

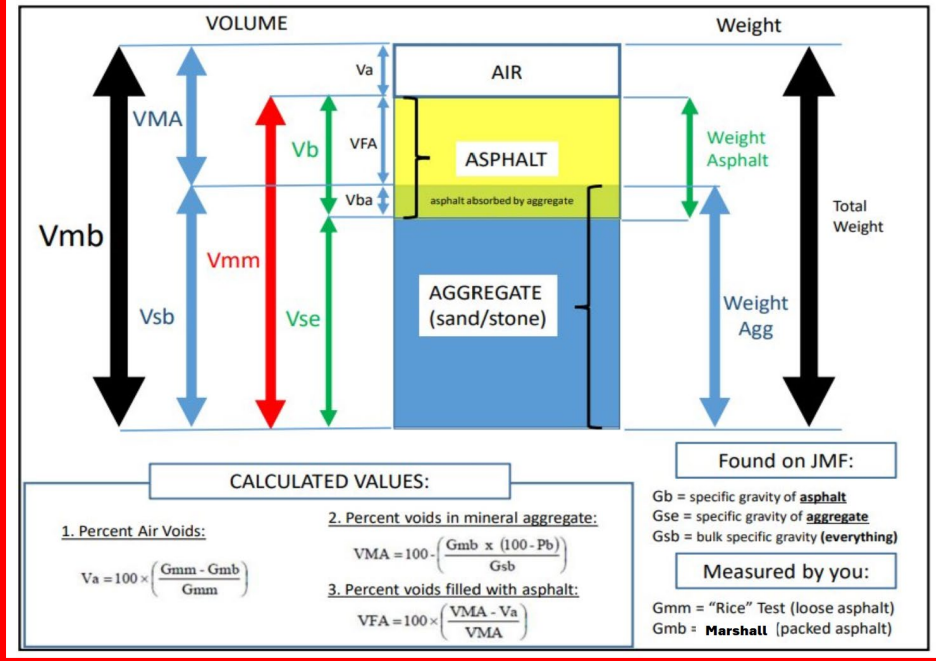
TEST NUMBER: 001

DATE: 07/07/2024

SIEVE	RETAINED FRACTIONAL WEIGHT	PERCENT	PERCENTS CUMULATIVE RETAINED	PASSING
2 1/2"				
1 1/2"				
1"				
3/4"				
1/2"				
3/8"	100			
1/4"				
NO. 4	95-100			
NO. 8	65-95			
NO. 16	35			
NO. 30	25			
NO. 50	15			
NO. 100	10			
PAN				
LRW	0.0			

Figure 34: MDOT Minimum Laboratory Test Sample Sizes

Nominal Maximum Size in inches (mm)	Minimum Weight of Test Sample in grams
No. 4 (4.75)	500 X 0.001 = 0.5 grams
3/8" (9.5)	1,000 X 0.001 = 1.0 grams
1/2" (12.5)	2,000 X 0.001 = 2.0 grams
3/4" (19.0)	2,500 X 0.001 = 2.5 grams
1" (25.0)	3,500 X 0.001 = 3.5 grams
1 1/2" (37.5)	5,000 X 0.001 = 5.0 grams



COURSE CONTENT – LECTURE AND LAB

- For most courses, MDOT requires that the students complete a full iteration of the test procedures as a practice for their exam
- The exam consists of a written component and a practical exam
- The students are allotted 8-hrs the final day to run all the same tests they would perform in the field or lab



STUDENT OUTCOMES AND SUCCESSSES

Highly focused on “The Why”

93% pass rate (retest options exist, generally after refresher course)

Students presented the material in 3 different ways over the course of 2-3 days

- Lecture
- Demonstration
- Hands-on practice)

Students must physically demonstrate full competency of methods and reporting to be certified

4:1 student teacher ratio in lab settings is required by MDOT

- Contributes to full participation
- Catches mistakes to avoid replicating bad habits in practice

Single point of contact (Ferris State) for training guarantees all students are trained in a standard/uniform manner

NEXT STEPS



Facility upgrades



Fall/Winter 2026 (stretch goal) of building a new lab space for Aggregate and Density courses



Goal to have space for 50 students for lecture-based trainings



Lab space for 15 individuals at a time desired, with dedicated power and water for each student's soil washing and direct heat drying process



\$800k raised internally to date, with anticipated industry donations projected to match or exceed