

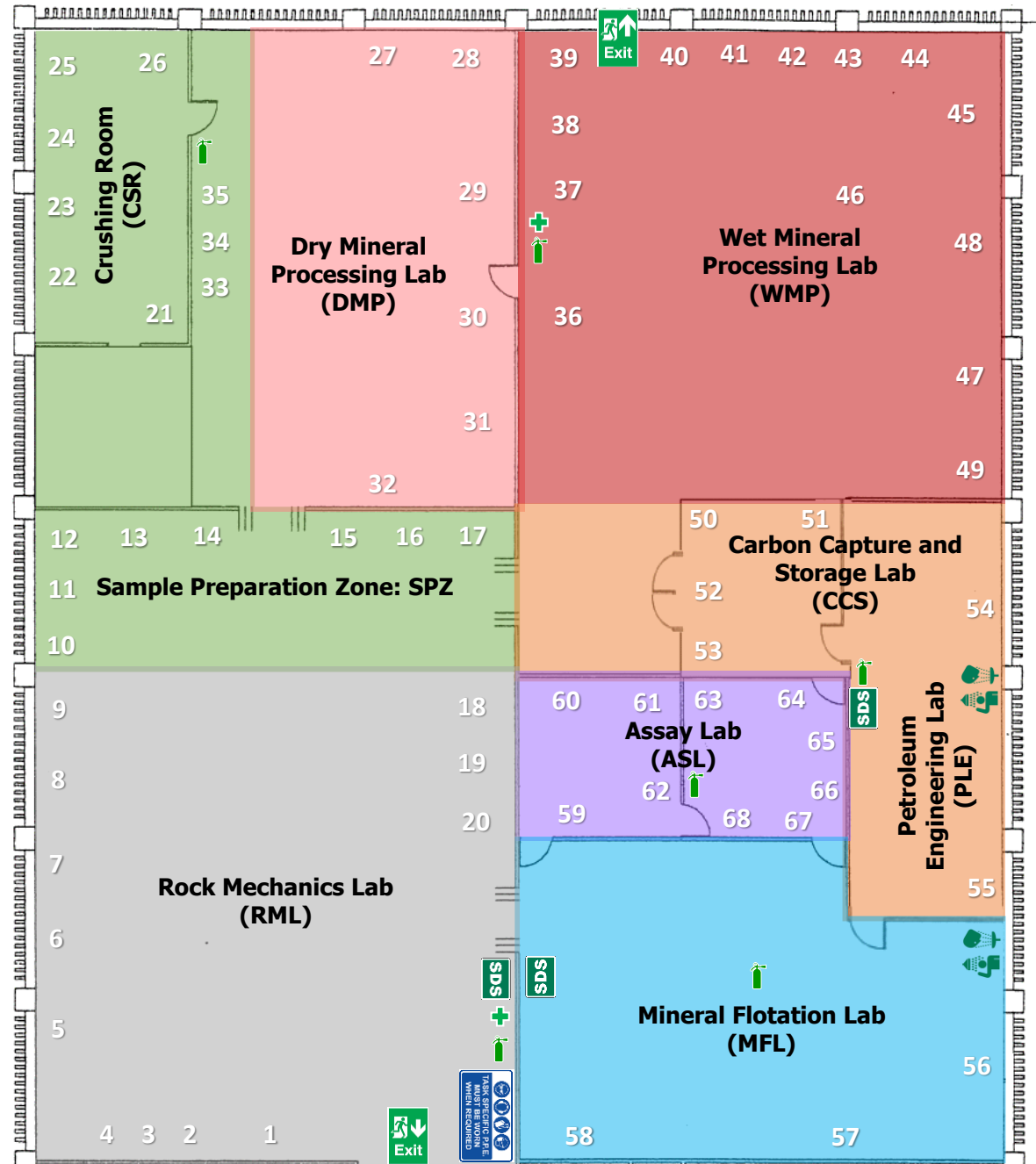


ระบบความปลอดภัย
ในห้องปฏิบัติการ
ภาควิชาวิศวกรรมเหมืองแร่
และปิโตรเลียม

คณะวิศวกรรมศาสตร์ มหาวิทยาลัยเชียงใหม่

Lab Equipment

แผนผัง ห้องปฏิบัติการ



Lab Equipment

Rock Mechanics Lab (RML)

1. Direct Shear Strength
2. Uniaxial Compressive Strength
3. Triaxial Compressive Strength
4. Brazilian: Tensile Strength
5. Swelling Strain
6. Slake Durability
7. Core Trimmer
8. Point Load Strength
9. Table Core Drill
18. Lab Oven (3)
19. Lab Oven (4)
20. Schmidt Hammer

Mineral Flotation Lab (MFL)

56. Fume Hood
57. Flotation Machine
58. Vacuum Pump

Sample Preparation Zone (SPZ) Crushing Room (CSR)

10. Sample Divider
11. Vibratory Disc Mill
12. Jaw Crusher (1)
13. Jaw Crusher (2)
14. Disc Grinder
15. Lab Oven (1)
16. Lab Oven (2)
17. Chamber Furnace
21. Los Angeles Abrasion
22. Jaw Crusher (3)
23. Roll Crusher
24. Hammer Mill
25. Disc Mill Crusher
26. Sieve Machine

Dry Mineral Processing Lab (DMP)

27. High Magnetic Separator
28. High Tension Separator
29. Bucket Elevator
30. Sieve Shaker
31. Magnetic Separator
32. Gladiator Color Sorter
33. Electronic Scales (1)
34. Electronic Scales (2)
35. Weighing Scales

Petroleum Engineering Lab (PLE) Carbon Capture and Storage Lab (CCS)

50. Heating Mantle
51. Overhead Stirrer
52. Benchtop Permeameter System
53. Tensiometer
54. Fume Hood
55. Rotational Viscometer

Wet Mineral Processing Lab (WMP)

36. Air Table
37. Knelson Concentrator
38. Jar Mill
39. Shaking Table
40. Wet Magnetic Separator
41. Batch Rod Mill
42. Batch Flotation Machine
43. Laboratory Hydrocyclone
44. Batch Ball Mill
45. Jig
46. Sieve Shaker
47. Humphrey Spiral Separator
48. Shaking Table
49. Spiral Classifier

Assay Lab (ASL)

59. Zeta Analyzer
60. Digital Microscope
61. X-Ray Diffractometer
62. X-Ray Fluorescence Analyzer
63. Electronic Scales (3)
64. Auto Bomb
65. Hot Plate Stirrer
66. Spectrophoto Meter
67. Ultrasonic
68. Abrasion Tester
69. Petrographic Polarizing Microscope

ห้องปฏิบัติการกลศาสตร์หิน

Rock Mechanics Lab: RML

วิชากลศาสตร์หิน, วิชาโครงการ, งานวิจัย, งานบริการวิชาการ

1. Direct Shear Strength

Rock Strength Test Set:

2. Uniaxial Compressive Strength

3. Triaxial Compressive Strength

4. Brazilian: Tensile Strength

5. Swelling Strain

6. Slake Durability

7. Core Trimmer

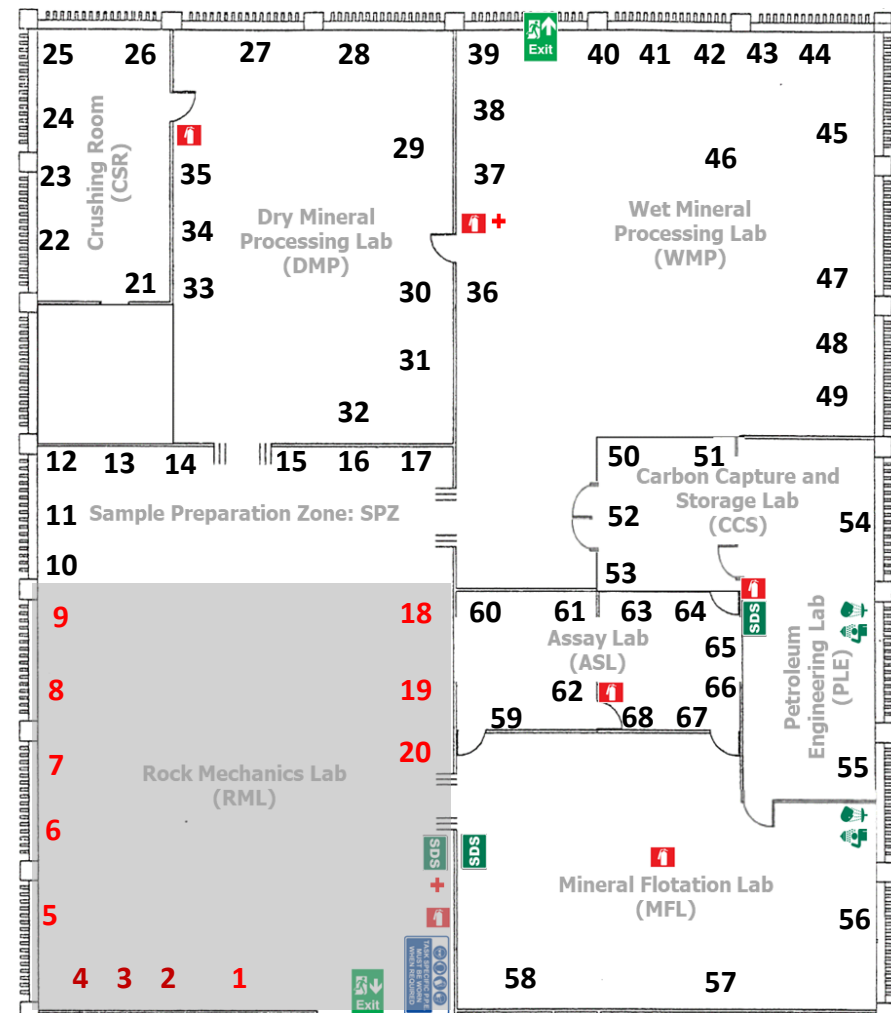
8. Point Load Strength

9. Table Core Drill

18. Lab Oven (3)

19. Lab Oven (4)

20. Schmidt Hammer



1. Rock Direct Shear Box

- 0631-104
- CONTROL
- 359,870



2,3,4. Rock Strength Test

- 0645-9965-05,,,21
- Model Controls S.P.A
- 1,514,000



5. Swelling box + Dial gauge

- 8654-002, 8654-001(1-3)-(3-3)
- TECLOCK KM-130
- 27,306



7. Core Trimmer Cut-Off Machine

- 0645-9965-03n.5
- Model Controls S.P.A 45-C0536
- 246,605



6. Slake Durability

- 0631-111
- KONTEST
- 94,820



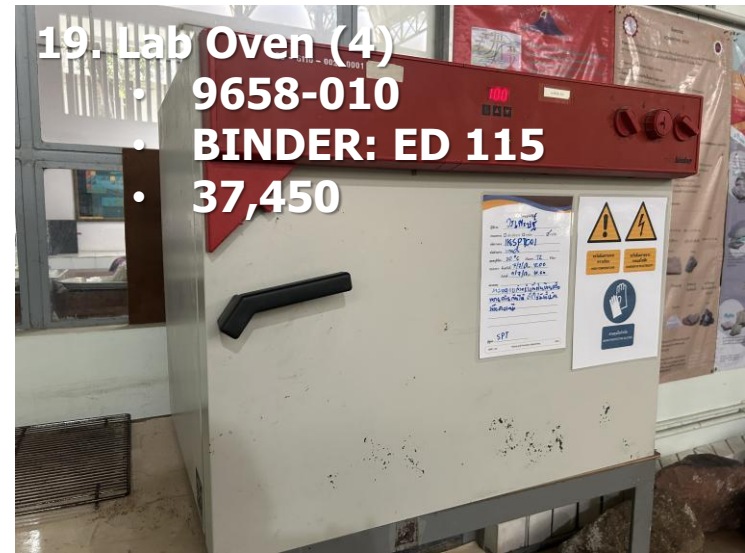
8. Point Load Test Apparatus

- 0645-9965-03 n.5
- Model Controls S.P.A 45-D550 A
- 70,686



19. Lab Oven (4)

- 9658-010
- BINDER: ED 115
- 37,450



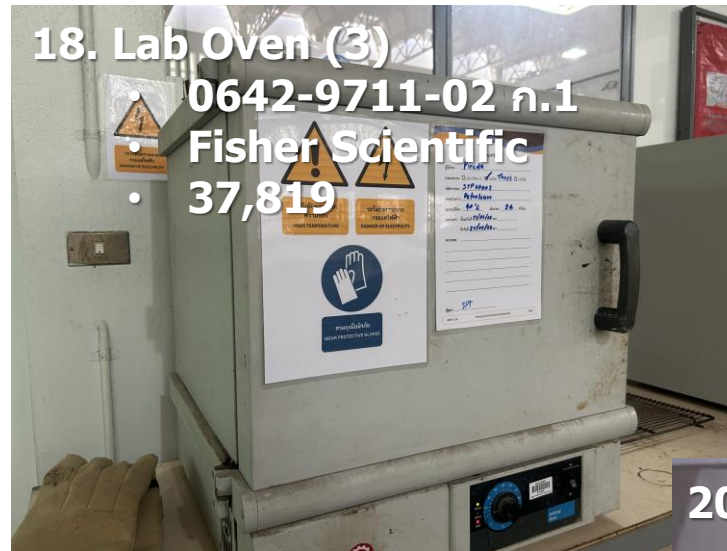
9. Table Core Drill

- 0629-104
- Geoquip
- 159,800



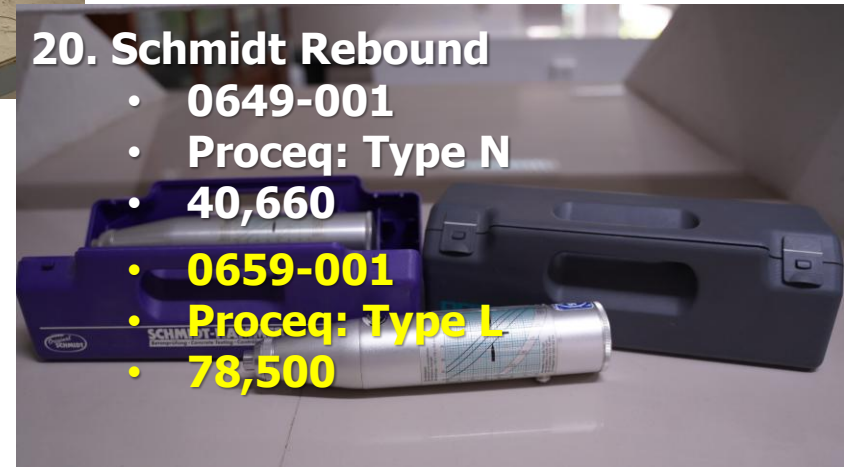
18. Lab Oven (3)

- 0642-9711-02 n.1
- Fisher Scientific
- 37,819



20. Schmidt Rebound

- 0649-001
- Proceq: Type N
- 40,660
- 0659-001
- Proceq: Type L
- 78,500

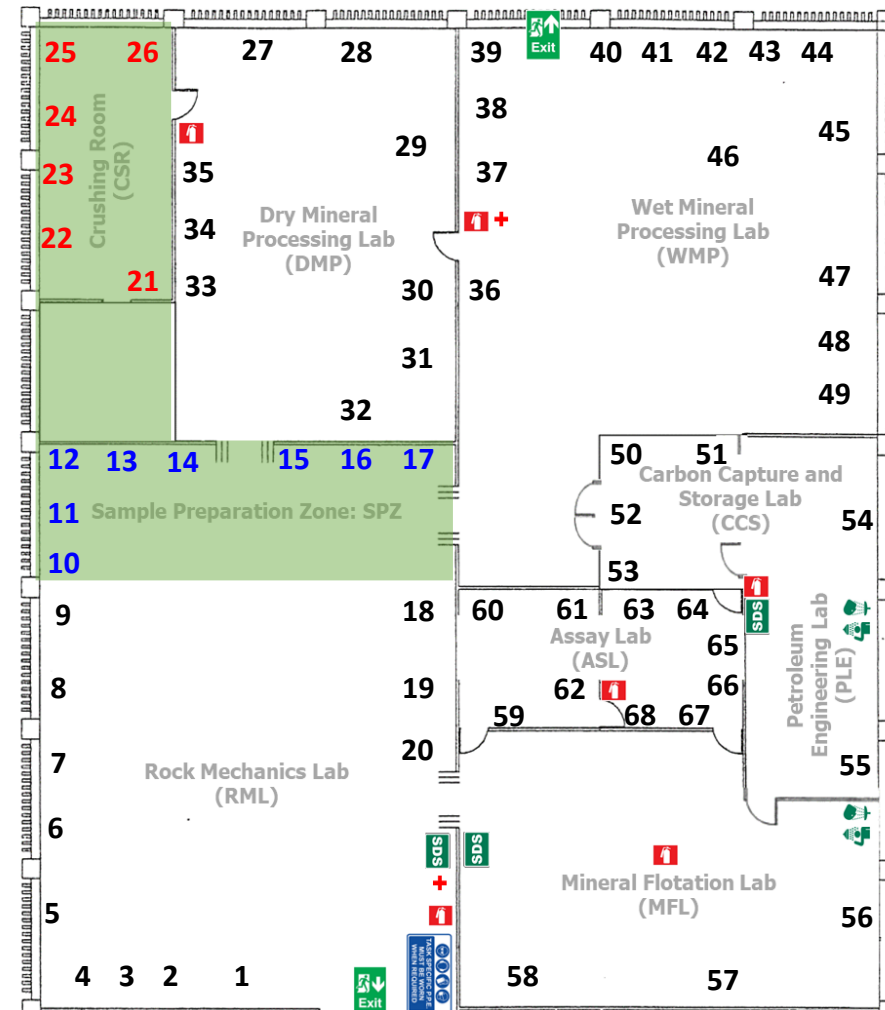


ห้องบดและบริเวณเตรียมตัวอย่าง

Crushing Room: **CSR** & **SPZ** :Sample Preparation Zone

ปฏิบัติการทุกวิชา, งานวิจัย, งานบริการวิชาการ

- 10. Sample Divider
- 11. Vibratory Disc Mill
- 12. Jaw Crusher (1)
- 13. Jaw Crusher (2)
- 14. Disc Grinder
- 15. Lab Oven (1)
- 16. Lab Oven (2)
- 17. Chamber Furnace
- 21. Los Angeles Abrasion
- 22. Jaw Crusher (3)
- 23. Roll Crusher
- 24. Hammer Mill
- 25. Disc Mill Crusher
- 26. Sieve Machine





10. Sample Divider
• 9658-022
• Thai
• 69,000



11. Vibratory Disc Mill
• 9658-021
• Thai
• 210,000



12. Jaw Crusher (1)
• 9658-017
• RETSCH: BB3
• 900,000



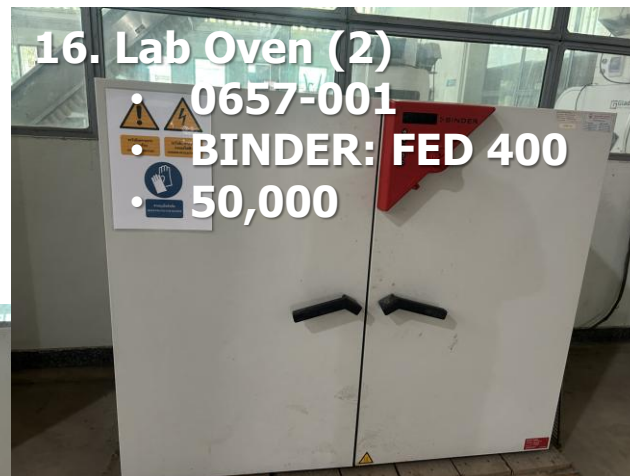
13. Jaw Crusher (2)
• 9658-003
• RETSCH: BB1
• 278,200



14. Disc Grinder
• 0631-107
• HERZOG:
HSM 100
50,000



15. Lab Oven (1)
• 0633-102
• BINDER: F 720
170,000



16. Lab Oven (2)
• 0657-001
• BINDER: FED 400
50,000



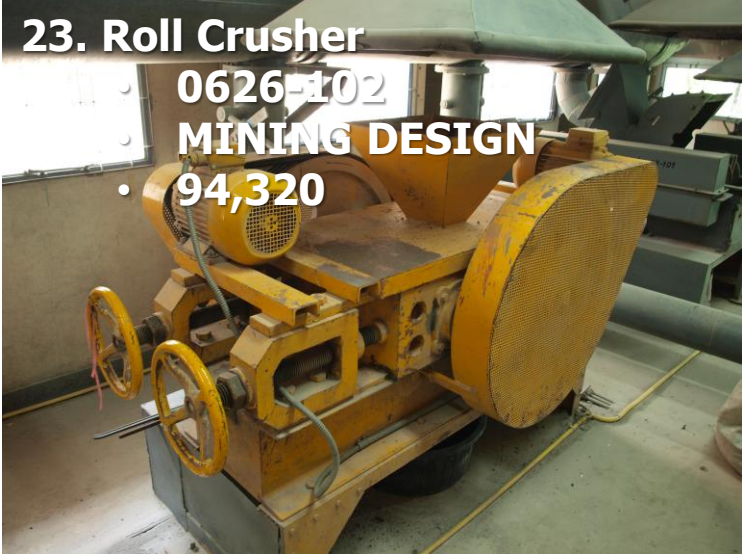
17. Chamber Furnace
• 0642-9711-
03 n.1
• VECSTAR
FURNACES
• 82,543



21. Los Angeles Abrasion
• 0631-111
• KONTEST
• 94,820



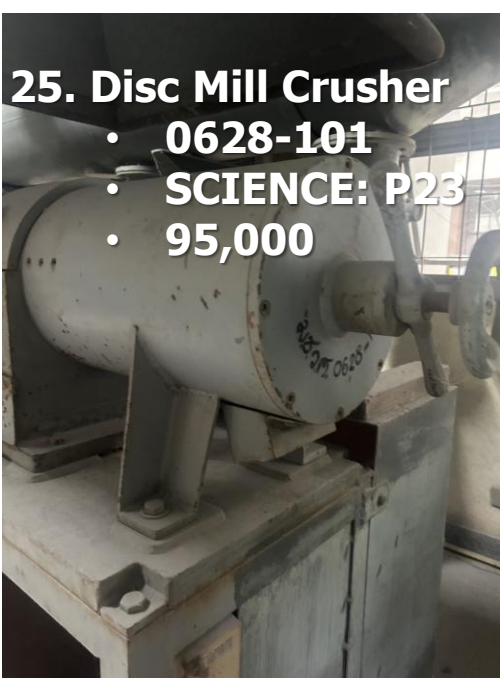
22. Jaw Crusher (3)
• 0626-101
• MINING DESIGN
• 79,000



23. Roll Crusher
• 0626-102
• MINING DESIGN
• 94,320



24. Hammer Mill
• 0629-101
• RETSCH:
HA4530
• 280,000



25. Disc Mill Crusher
• 0628-101
• SCIENCE: P23
• 95,000



26. Sieve Machine
• 9627-004
• THAI
• 20,000

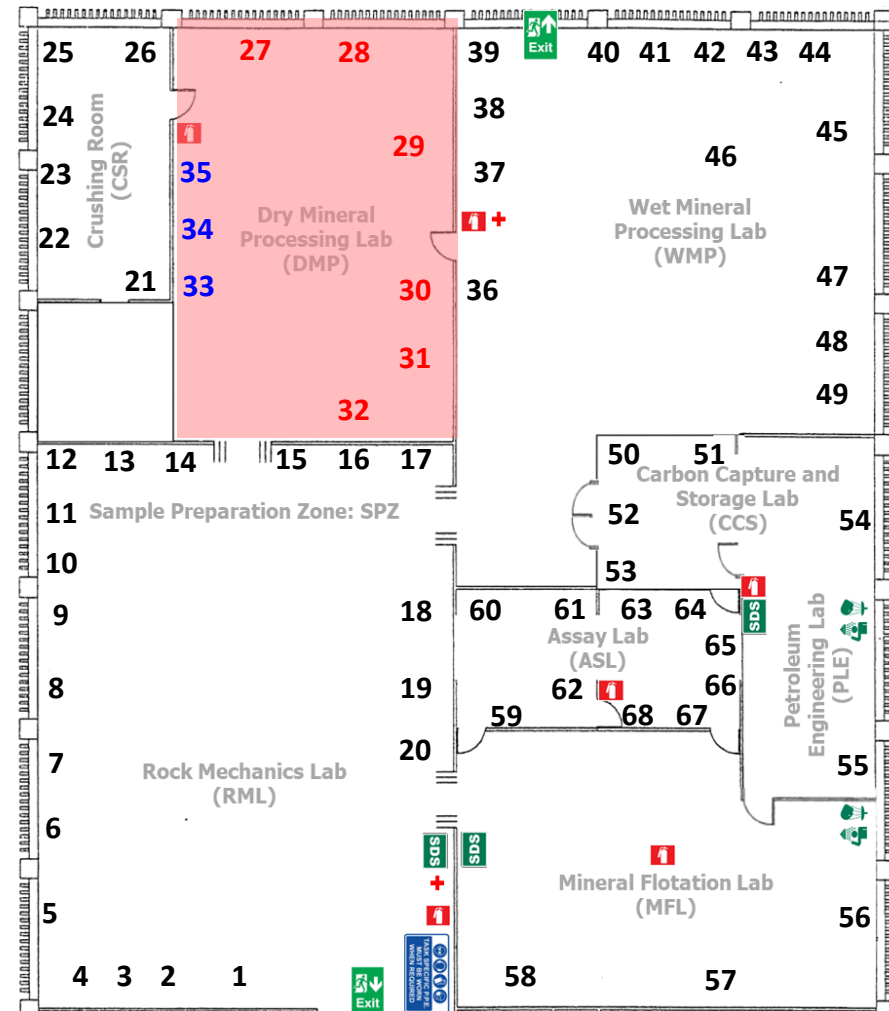
ห้องปฏิบัติการแต่งแร่แบบแห้ง

Dry Mineral Processing Lab: **DMP**

วิชาแต่งแร่ 1, วิชาโครงการ, งานวิจัย

- 27. High Magnetic Separator
- 28. High Tension Separator
- 29. Bucket Elevator
- 30. Sieve Shaker
- 31. Magnetic Separator
- 32. Gladiator Color Sorter

- 33. Electronic Scales (1)
- 34. Electronic Scales (2)
- 35. Weighing Scales





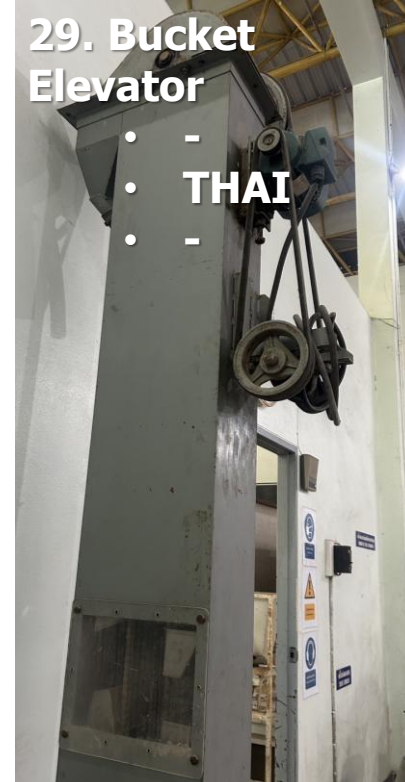
27. High Magnetic Separator

- 0630-101
- SCIENCE: SC64
- 641,000



28. High Tension Separator

- 0628-108
- SCIENCE: HT50
- 245,000



29. Bucket Elevator

- -
- THAI
- -



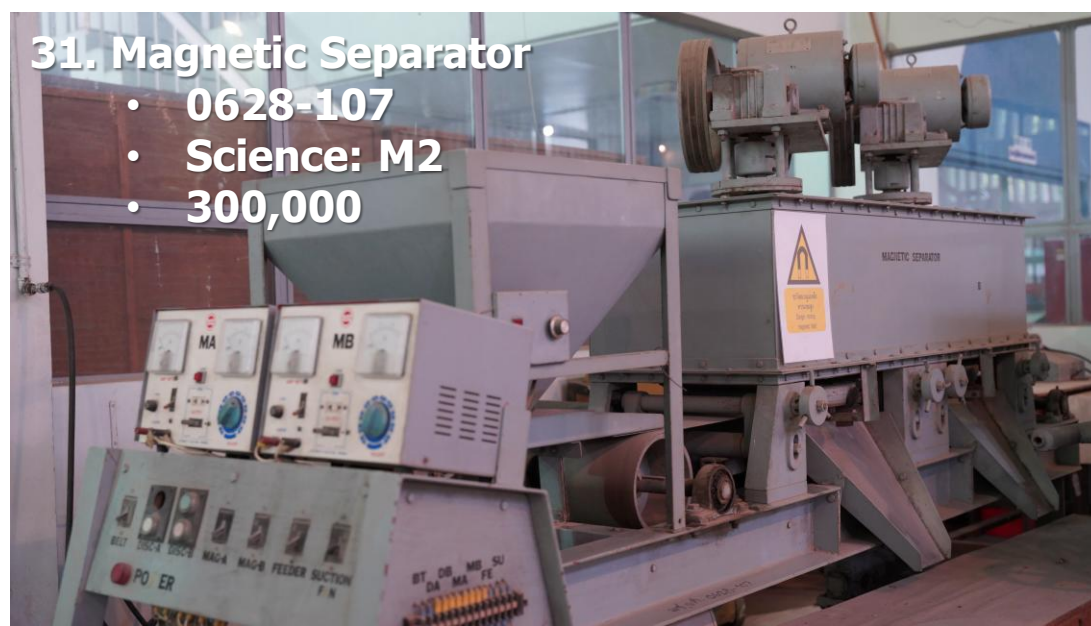
30. Sieve Shaker

- 0627-102
- Endecotts
- 20,000



32. Gladiator Color Sorter

- 0668-001(1-3)-(3-3)
- G-1
- 1,284,000

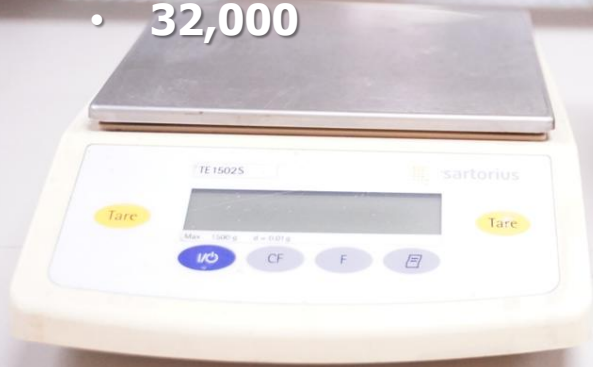


31. Magnetic Separator

- 0628-107
- Science: M2
- 300,000

33. Electronic Scales (1)

- 8648-003
- SUTORIUS: TE 15025
- 32,000



34. Electronic Scales (2)

- 8650-003
- OHAUS: Adventurer
- 62,500



35. Weighing Scales

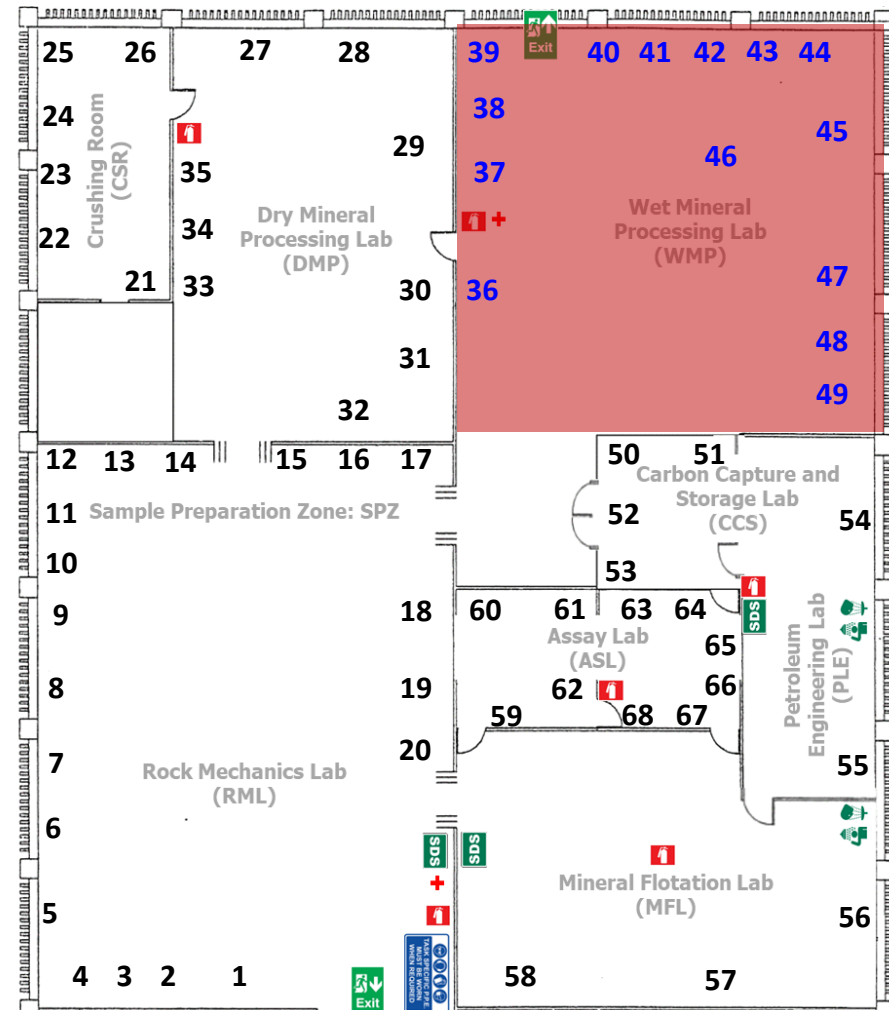
- 0627-105(1-3)
- SOHNLE: 4715
- 25,666

ห้องปฏิบัติการแต่งแร่แบบเปียก

Wet Mineral Processing Lab: WMP

วิชาแต่งแร่ 1, วิชาโครงการ, งานวิจัย

- 36. Air Table
- 37. Knelson Concentrator
- 38. Jar Mill
- 39. Shaking Table
- 40. Wet Magnetic Separator
- 41. Batch Rod Mill
- 42. Batch Flotation Machine
- 43. Laboratory Hydrocyclone
- 44. Batch Ball Mill
- 45. Jig
- 46. Sieve Shaker
- 47. Humphrey Spiral Separator
- 48. Shaking Table
- 49. Spiral Classifier





36. Air Table
• 0630-102
• SEPOR: V-135E
• 349,500



38. Jar Mill
• 0630-105
• SCIENCE: SC 230
• 229,800



39. Shaking Table
• 9664-024
• THAIPATTANA SAHAKIT
• 120,000



37. Knelson Concentrator
• 0640-004
• Knelson C-D
• 449,400



42. Batch Flotation Machine
• 0635-100
• THAI
• -



40. Wet Magnetic Separator
• 8667-006
• CHINA
• 839,950



41. Batch Rod Mill
• 0626-104
• MINING DESIGN
• 145,985



43. Laboratory Hydrocyclone
• 0628-106
• Science: SC 330
• 220,000



44. Batch Ball Mill
• 0626-103
• MINING DESIGN
• 93,890



45. Jig
• 9664-024
• THAI PATTA NA SAHAKIT
• 120,000



46. Sieve Shaker
• 0643-002
• ENDECOTTS: EFL 2000 1
• 105,000



47. Humphrey Spiral Separator
• 0628-109
• Science: SP-6
• 387,299



48. Shaking Table
• 9627-003
• THAI
• 30,000

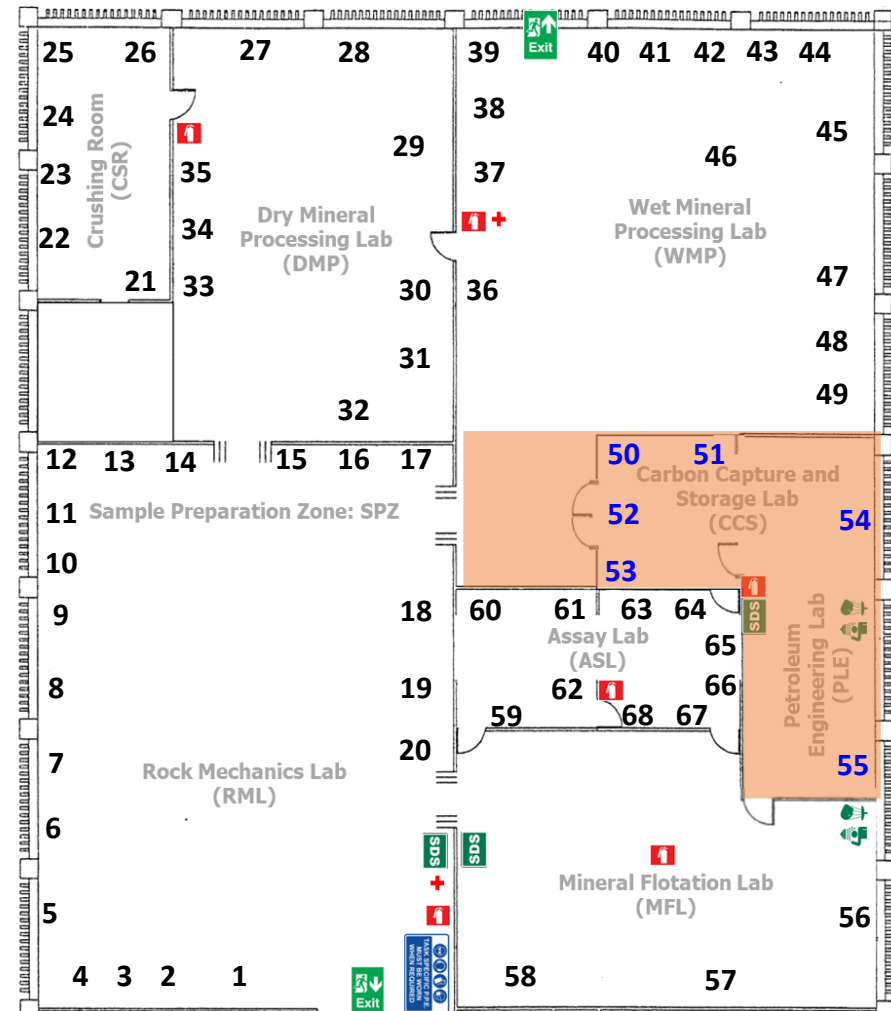


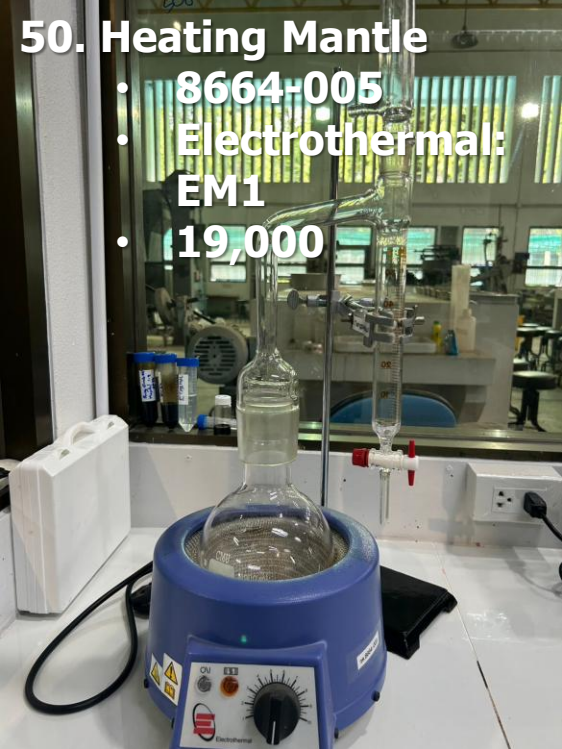
49. Spiral Classifier
• 9627-004
• THAI
• 20,000

ห้องปฏิบัติการวิศวกรรมปิโตรเลียม **Petroleum Engineering Lab: PLE)**

วิชาด้านปิโตรเลียม, วิชาโครงการ, งานวิจัย

- 50. Heating Mantle
- 51. Overhead Stirrer
- 52. BENCHTOP Permeameter System
- 53. Tensiometer
- 54. Fume Hood
- 55. Rotational Viscometer





50. Heating Mantle

- 8664-005
- Electrothermal: EM1
- 19,000



51. Overhead Stirrer

- 8066-109
- IKA: RW20
- 27,550



52. Benchtop Permeameter System

- 0665-001
- Vinci Technologies: BPS350
- 3,278,480



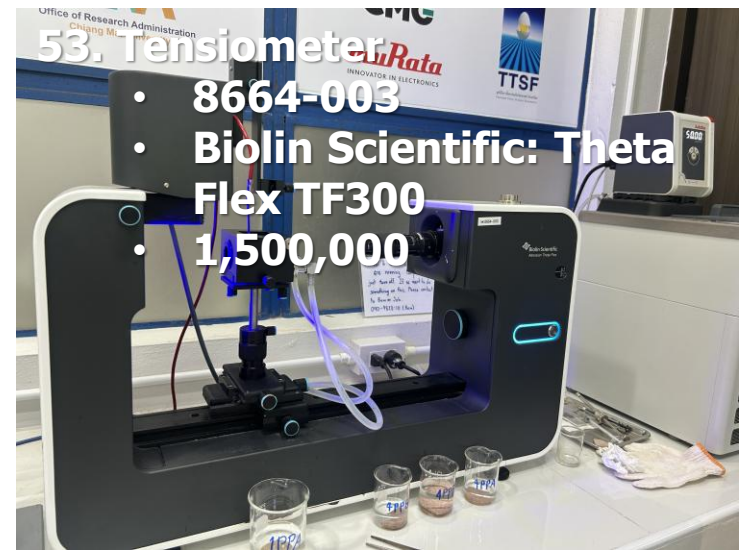
55. Rotational Viscometer

- 0668-004
- FANN Model 50SL Rheometer
- 5,478,606



54. Fume Hood

- 8667-013(1-4),(2-4)
- Flexlab: FE120SC
- 483,640



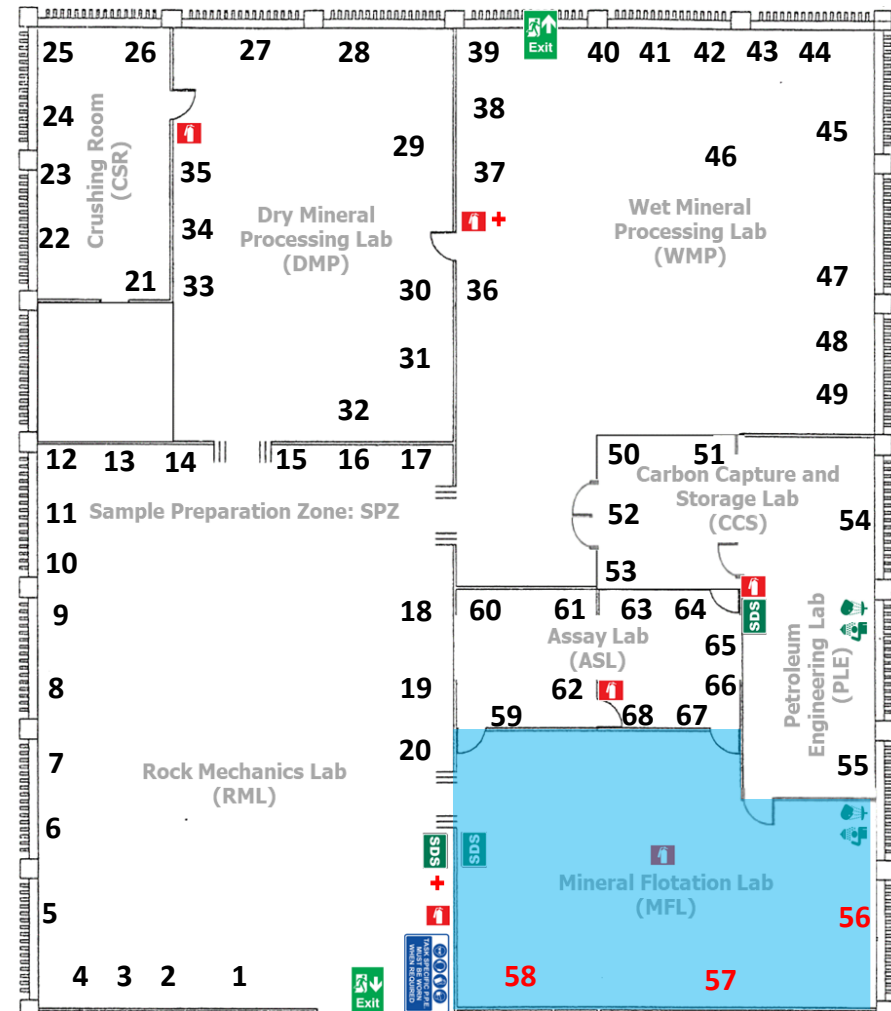
53. Tensiometer

- 8664-003
- Biolin Scientific: Theta Flex TF300
- 1,500,000

ห้องปฏิบัติการการลอยแร่ Mineral Flotation Lab: **MFL**

วิชาแต่งแร่ 1,2, วิชาโครงการ, งานวิจัย

- 56. Fume Hood
- 57. Flotation Machine
- 58. Vacuum Pump



56. Fume Hood

- 8667-013(3-4),(4-4)
- Flexlab: FE120SC
- 483,640



57. Flotation Machine

- 0628-105(1-4)-(4-4)
- SCIENCE: F1
- 160,000



- 7627-001
- DENVER: D-12
- 140,000



- 0640-001
- DENVER: D-12
- 200,000

58. Vacuum Pump

- 0638-002
- OP: KV-3N
- 220,000

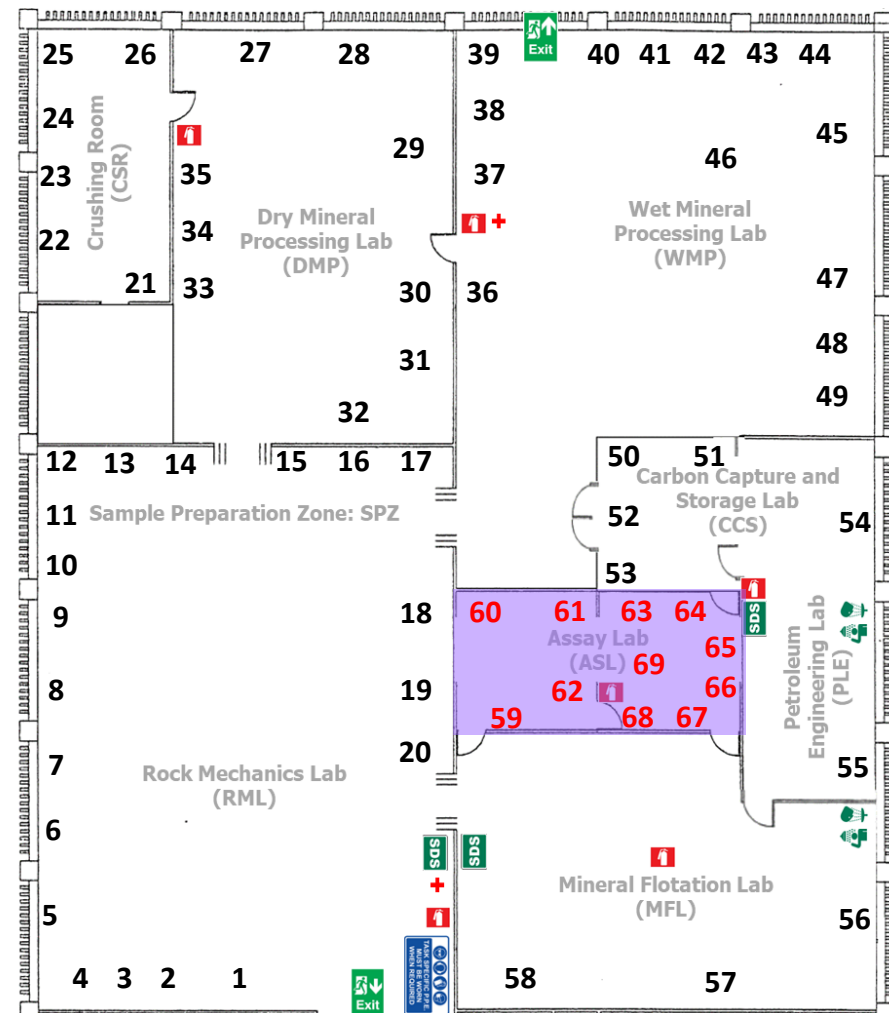


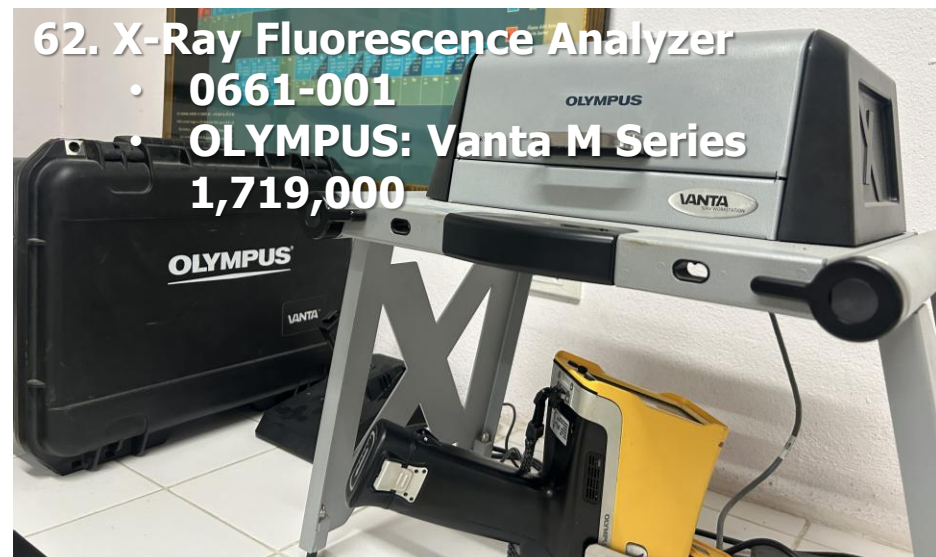
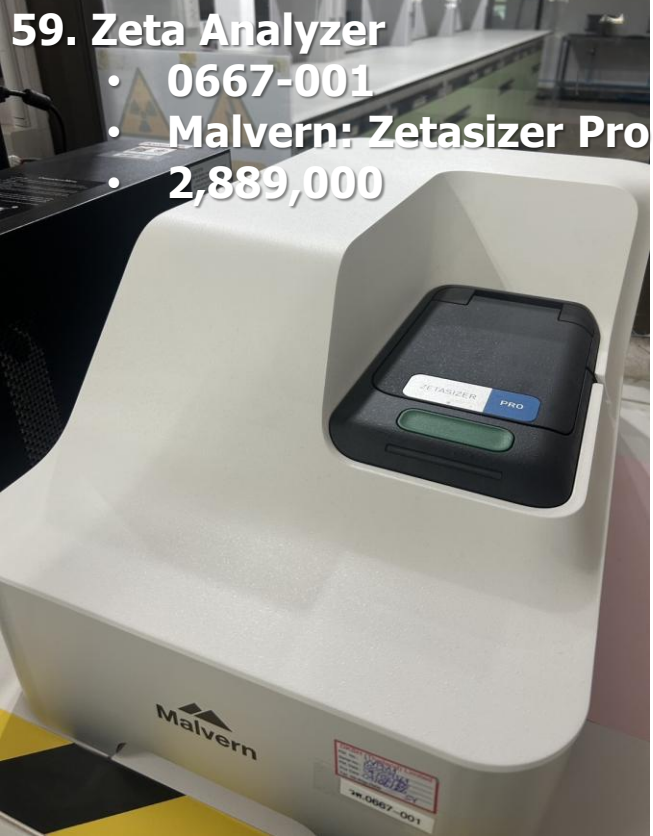
ห้องปฏิบัติการวิเคราะห์แร่และถ่านหิน

Assay Lab: **ASL**

วิชาแต่งแร่ 1,2, วิชาโครงการ, งานวิจัย

- 59. Zeta Analyzer
- 60. Digital Microscope
- 61. X-Ray Diffractometer
- 62. X-Ray Fluorescence Analyzer
- 63. Electronic Scales (3)
- 64. Auto Bomb
- 65. Hot Plate Stirrer
- 66. Spectrophoto Meter
- 67. Ultrasonic
- 68. Abrasion Tester
- 69. Petrographic Polarizing Microscope





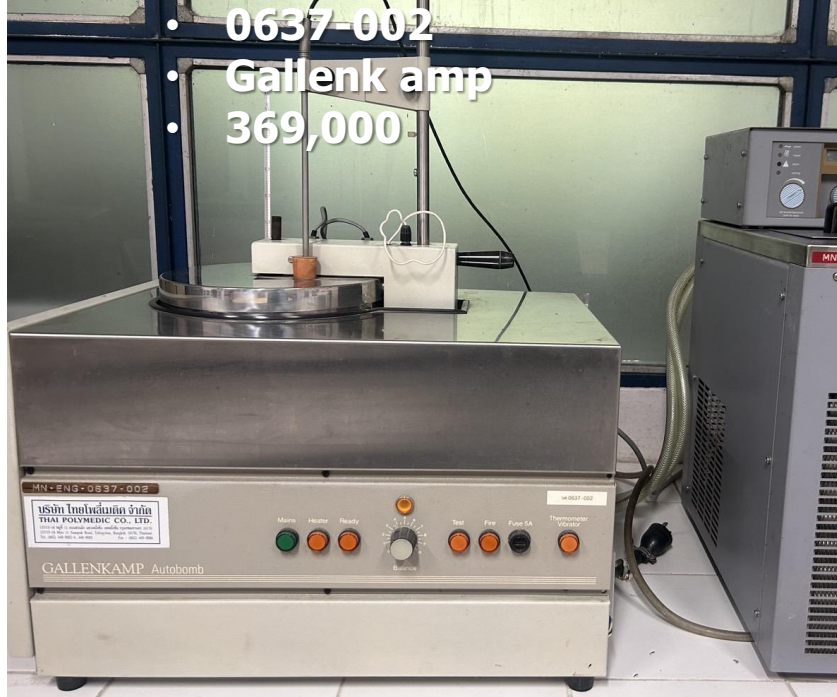
63. Electronic Scales (3)

- 0639-001
- METTLER
- TOLEDO: AT400
- 58,000



64. Auto Bomb

- 0637-002
- Gallenk amp
- 369,000



65. Hot Plate Stirrer

- 9665-003
- C-MAG HS 7
- 16,800



66. Spectrophoto Meter

- 9646-001
- Model 350
- 15,000



67. Ultrasonic

- 8646-002
- Sturdy: UC-80
- 13,000



68. Abrasion Tester

- 0645-9965-25n.
- EINLEHNER: S.P.A
- AT1000
- 567,665



Field Equipment & Geologic Tools

70. TSP High Volume Air Sampler

71. PM-10 High Volume Air Sampler

72. Sound Level Meter

73. Vibration Monitors

74. Smoke Opacity Meter

75. Wind Speed Anemometer

76. GPS

77. Unmanned Aerial Vehicle (Drone)

78. GNSS (Network RTK)

79. Photogrammetry Survey Set, ShapeMetrix3D

80. Dead Zone Transceiver

81. Laser Rangefinder & Hypsometer

82. Geologic Compass

83. Geologic Hammer

84. Hand Auger

85. Topographic Map

86. Specific Gravity Testion Set

87. Mechanical Scales

88. Totalizing Counter

89. Hardness Moh' Scale

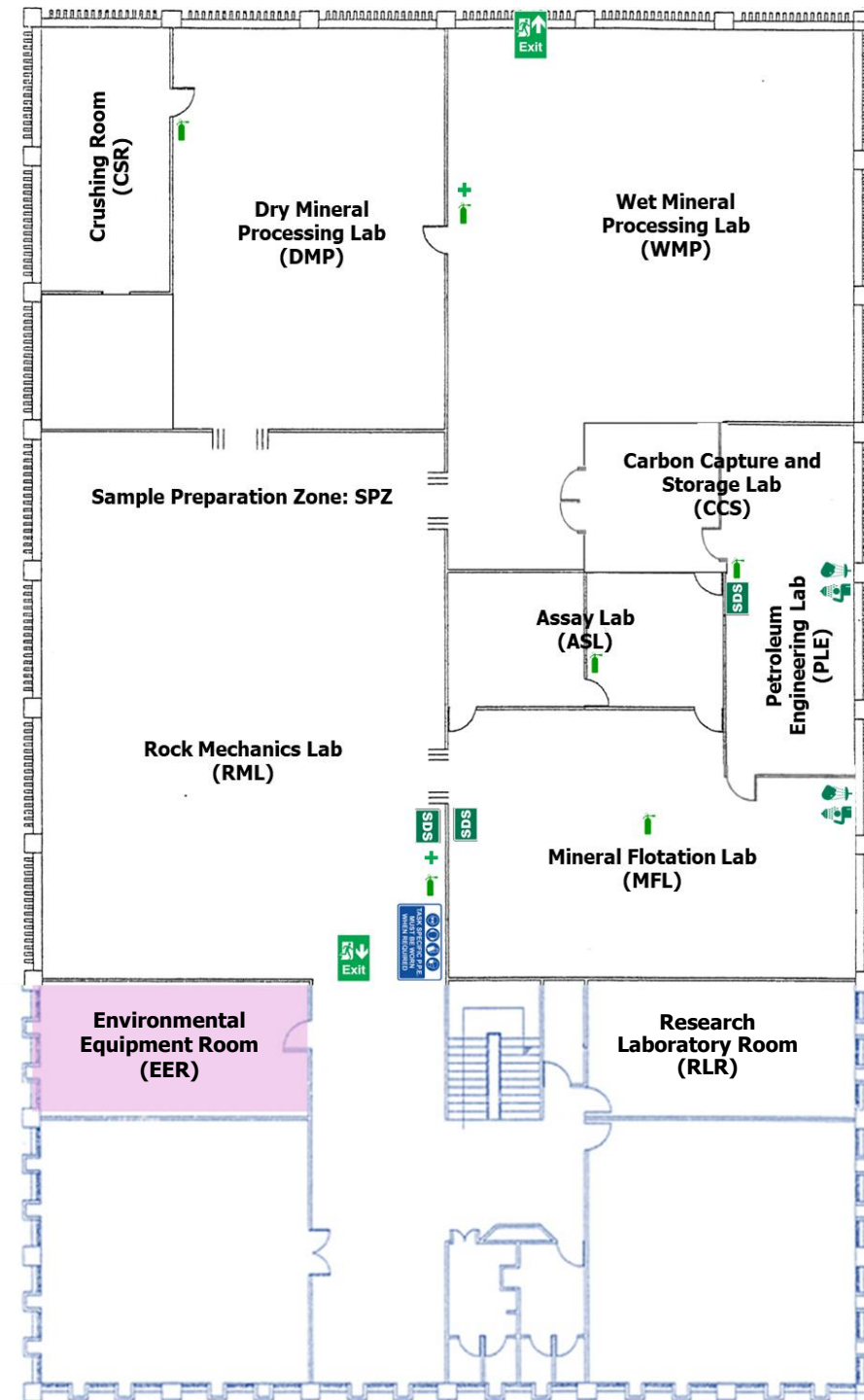
90. Rock & Mineral Sample

ห้องทับทิม

Environmental Equipment Room: EER

วิชาสิ่งแวดล้อมฯ, วิชาโครงการ, งานวิจัย

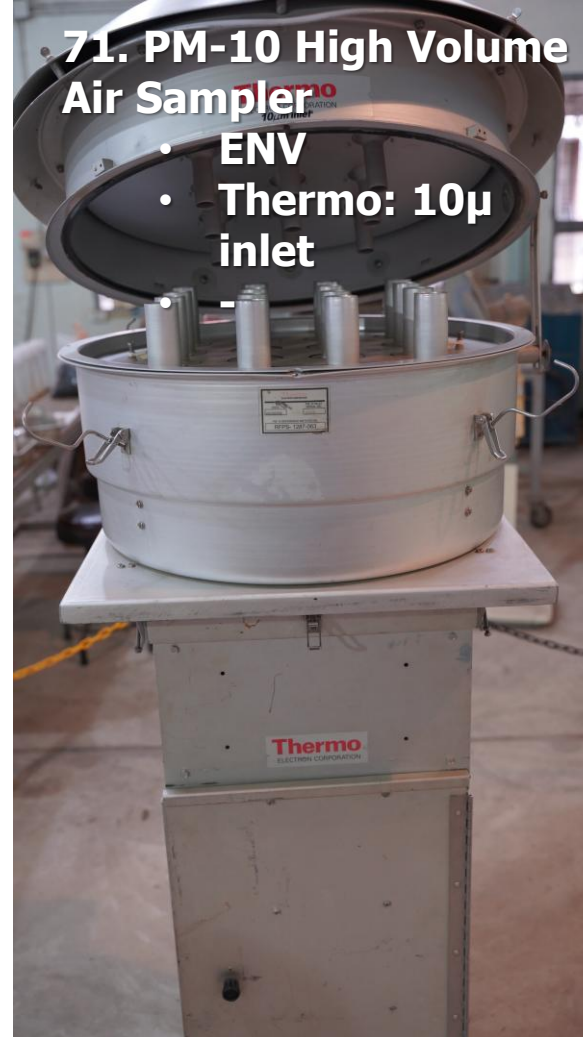
- 70. TSP High Volume Air Sampler
- 71. PM-10 High Volume Air Sampler
- 72. Sound Level Meter
- 73. Vibration Monitors
- 74. Smoke Opacity Meter
- 75. Wind Speed Anemometer
- 76. GPS





70. TSP High Volume Air Sampler

- 0657-004(1-2)-(2-2)
- Thai
- 58,101



71. PM-10 High Volume Air Sampler

- ENV
- Thermo: 10µ inlet

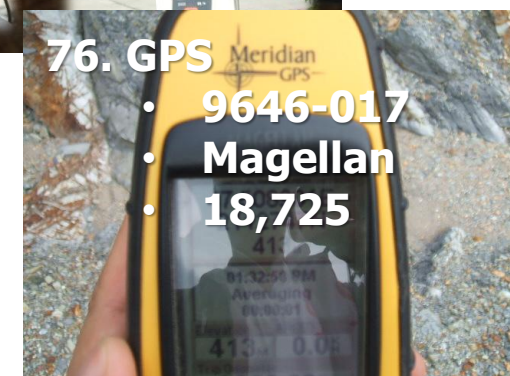


72. Sound Level Meter

- 0642-9712-01 n.1
- Routeco PLC: 4004 12709
- 51,627

0648-001

- CASELLA CEL: CEL 3605
- 107,000



76. GPS Meridian

- 9646-017
- Magellan
- 18,725



73. Vibration Monitors

- 8655-004
- Instantel: Minimata Blaster
- 300,000



74. Smoke Opacity Meter

- MNP



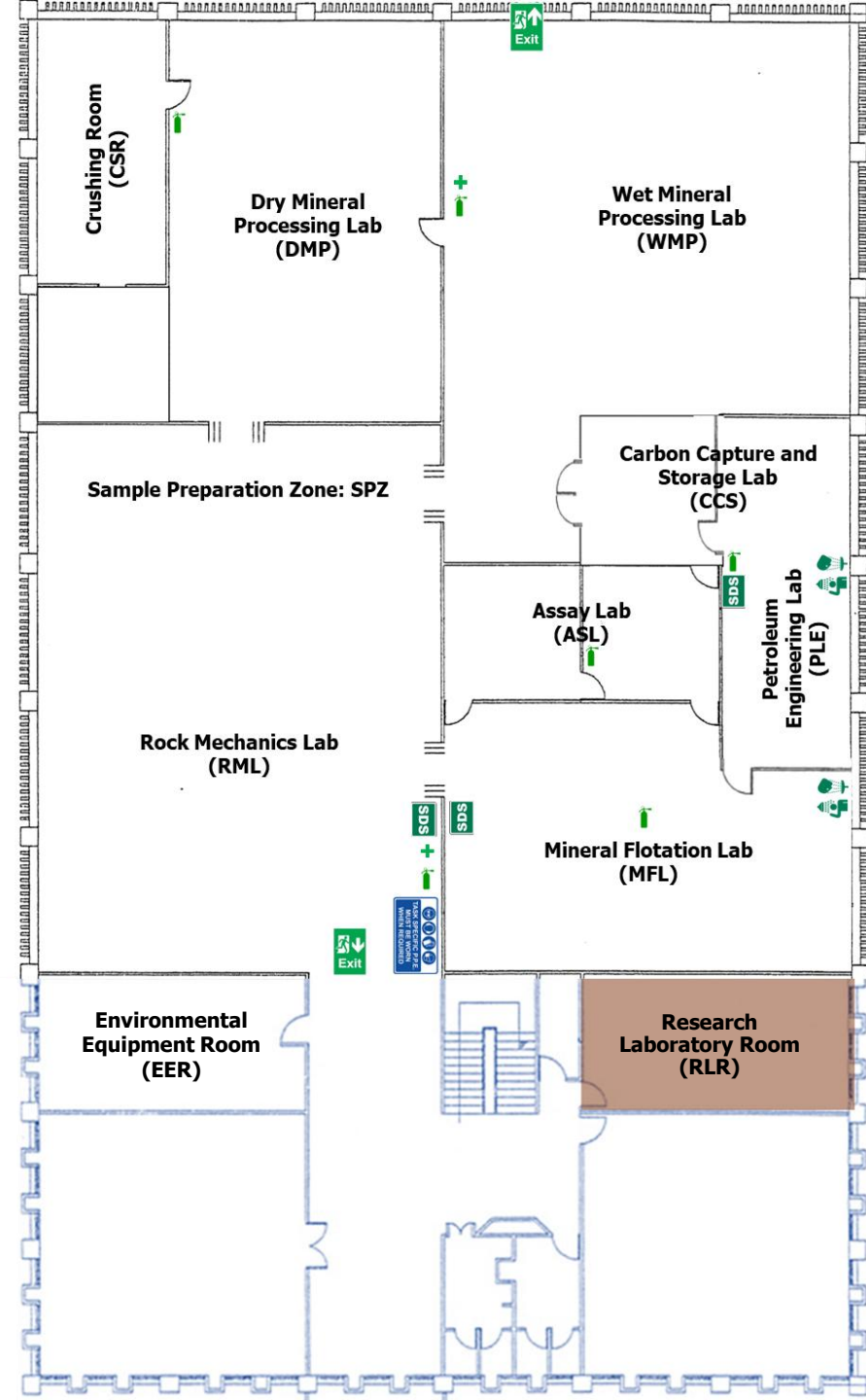
75. Wind Speed Anemometer

- MNP

ห้องวิจัย Research Laboratory Room: **RLR**

วิชาธรณีสารสนเทศฯ, ธรณีเสถียร, วิชาโครงการ, งานวิจัย

- 77. Unmanned Aerial Vehicle (Drone)
- 78. GNSS (Network RTK)
- 79. Photogrammetry Survey Set, ShapeMetrix3D
- 80. Dead Zone Transceiver
- 81. Laser Rangefinder & Hypsometer
- 82. Geologic Compass
- 83. Geologic Hammer
- 84. Hand Auger
- 85. Topographic Map
- 86. Specific Gravity Testion Set
- 87. Mechanical Scales
- 88. Totalizing Counter
- 89. Hardness Moh' Scale
- 90. Rock & Mineral Sample







81. Laser Rangefinder & Hypsometer

- MNP
- Nikon: Forestry Pro
- 20,000



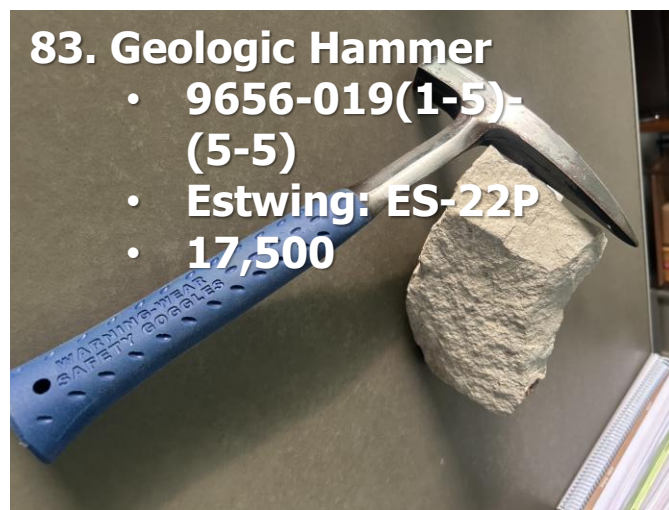
82. Geologic Compass

- 0628-104(1-3)-(3-3)
- Brunton Pocket Transit: TAMAYA 312
- 18,000
- 9656-020(1-5)-(5-5)
- Sunto: MC-2DL
- 17,500



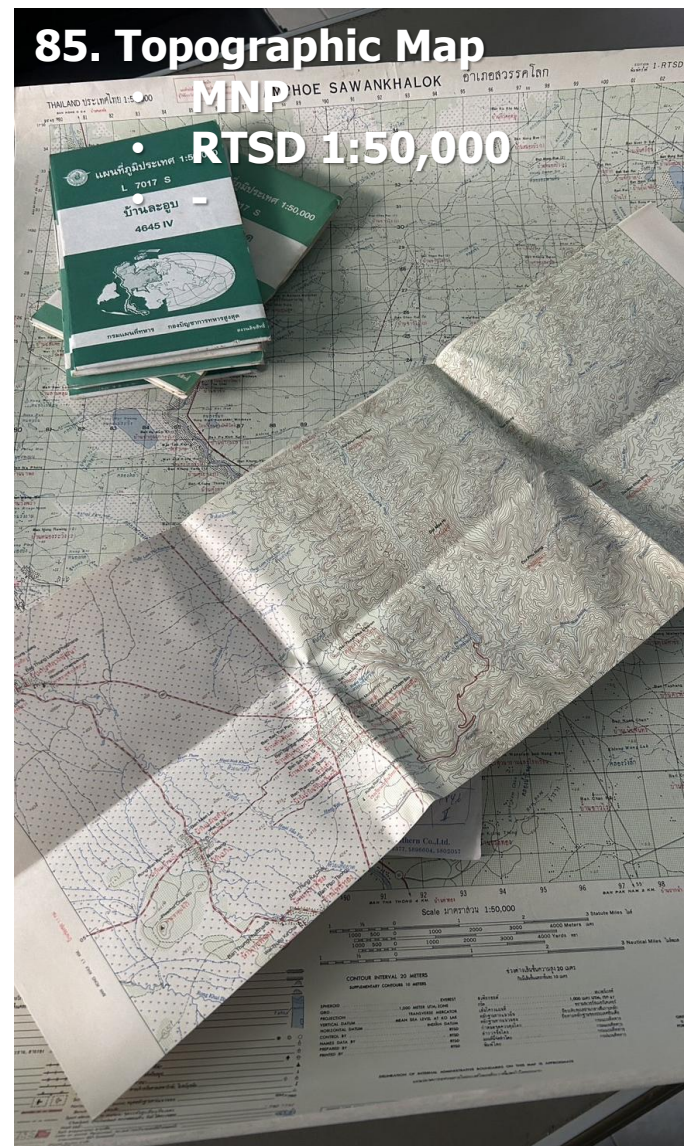
84. Hand Auger

- MNP
- -
- 8,000



83. Geologic Hammer

- 9656-019(1-5)-(5-5)
- Estwing: ES-22P
- 17,500



85. Topographic Map

- MNP
- RTSD 1:50,000



86. Specific Gravity Testion Set

- 0630-113
- WARD'S: 13-0329
- 16,000



87. Mechanical Scales

- MNP
- OHAUS: 700 Series
- 16,000



88. Totalizing Counter

- 0627-106(1-2)-(2-2)
- NEDTEX โมเดล DBC-6
- 9,400



89. Hardness Moh' Scale

- 0627-110, MNP
- USA, AMEP
- 2,000+1,000



90. Rock & Mineral Sample

- MNP
- -
- -