SKILLEDTRADES BC

PROGRAM OUTLINE

Landscape Horticulturist

SKILLED TRADES BC

The latest version of this document is available in PDF format on the SkilledTradesBC website
www.skilledtradesbc.ca

To order printed copies of Program Outlines
or learning resources (where available)
for BC trades contact:

Crown Publications, Queen's Printer
Web: www.crownpub.bc.ca
Email: crownpub@gov.bc.ca
Toll Free 1 800 663-6105

SKILLED TRADES BC

LANDSCAPE HORTICULTURIST

PROGRAM OUTLINE

APPROVED BY INDUSTRY

SEPTEMBER 2017

BASED ON

RSOS 2017

Developed by
SkilledTradesBC
Province of British Columbia

TABLE OF CONTENTS

Section 1

INTRODUCTION

Landscape Horticulturist

Foreword

The revised Landscape Horticulturist Program Outline is intended as a guide for instructors, apprentices and employers of apprentices as well as for the use of industry organizations, regulatory bodies, and provincial and federal governments. It reflects updated standards based on the new Landscape Horticulturist Occupational Analysis (2017) and British Columbia industry and instructor subject matter experts.

Practical instruction by demonstration and student participation should be integrated with the classroom session. Safe working practices, even though not always specified in each operation or topic, are an implied part of the program and should be stressed throughout the apprenticeship.

Practical exercises are included for those competencies that require a practical component. The intent of including practical exercises is to ensure consistency in training across the many training institutions in British Columbia. Their purpose is to reinforce the theory and to provide a mechanism for evaluation of the learner's ability to apply the theory to practice. It is important that these performances be observable and measureable and that they reflect the skills spelled out in the competency as those required of a competent journeyperson. The conditions, under which these performances will be observed, as well as the criteria by which the learner will be evaluated and measured, must be clear to the learner. The learner must also be given the level of expectation of success.

SAFETY ADVISORY

Be advised that references to the WorkSafe BC safety regulations contained within these materials do not/may not reflect the most recent Occupational Health and Safety Regulation (the current Standards and Regulation in BC can be obtained on the following website: http://www.worksafebc.com). Please note that it is always the responsibility of any person using these materials to inform him/herself about the Occupational Health and Safety Regulation pertaining to his/her work.

Acknowledgements

Industry and Instructor Subject Matter Experts retained to assist in the development of the Occupational Analysis Chart:

- Jeff Foley — Para Space Landscaping Inc.
- Betty Cunnin — Kwantlen Polytechnic University
- Heike Stippler — Heike Designs Ltd.
- Catherine Dale — Burnaby School District

Industry and Instructor Subject Matter Experts retained to assist in the development of Program Outline and Program Profile content:

- Jeff Foley — Para Space Landscaping Inc.
- Betty Cunnin — Kwantlen Polytechnic University
- Heike Stippler — Heike Designs Ltd.
- Kevin Jones — Vancouver Island University
- Anne Kadwell — Horiticulture Consultant
- Laura Principe — City of Vancouver Parks Department
- Laura Biggs — Pacific Horticulture College

SkilledTradesBC would like to acknowledge the dedication and hard work of all the industry representatives appointed to identify the training requirements of the Landscape Horticulture occupation.

How to Use this Document

This Program Outline has been developed for the use of individuals from several different audiences. The table below describes how each section can be used by each intended audience.

Section	Training Providers	Employers/ Sponsors	Apprentices	Challengers
Program Credentialing Model	Communicates program length and structure, and all pathways to completion	Understand the length and structure of the program	Understand the length and structure of the program, and pathway to completion	Understand challenger pathway to Certificate of Qualification
OAC	Communicates the competencies that industry has defined as representing the scope of the occupation	Understand the competencies that an apprentice is expected to demonstrate in order to achieve certification	View the competencies they will achieve as a result of program completion	Understand the competencies they must demonstrate in order to challenge the program
Training Topics and Suggested Time Allocation	Shows proportionate representation of general areas of competency (GACs) at each program level, the suggested proportion of time spent on each GAC, and percentage of time spent on theory versus practical application	Understand the scope of competencies covered in the technical training, the suggested proportion of time spent on each GAC, and the percentage of that time spent on theory versus practical application	Understand the scope of competencies covered in the technical training, the suggested proportion of time spent on each GAC, and the percentage of that time spent on theory versus practical application	Understand the relative weightings of various competencies of the occupation on which assessment is based
Program Content	Defines the objectives, learning tasks, high level content that must be covered for each competency, as well as defining observable, measureable achievement criteria for objectives with a practical component	Identifies detailed program content and performance expectations for competencies with a practical component; may be used as a checklist prior to signing a recommendation for certification (RFC) for an apprentice	Provides detailed information on program content and performance expectations for demonstrating competency	Allows individual to check program content areas against their own knowledge and performance expectations against their own skill levels
Training Provider Standards	Defines the facility requirements, tools and equipment, reference materials (if any) and instructor requirements for the program	Identifies the tools and equipment an apprentice is expected to have access to; which are supplied by the training provider and which the student is expected to own	Provides information on the training facility, tools and equipment provided by the school and the student, reference materials they may be expected to acquire, and minimum qualification levels of program instructors	Identifies the tools and equipment a tradesperson is expected to be competent in using or operating; which may be used or provided in a practical assessment

Section	Training Providers	Employers/ Sponsors	Apprentices	Challengers
Appendix – Glossary of Acronyms			Defines program specific acronyms	

Section 2

PROGRAM OVERVIEW

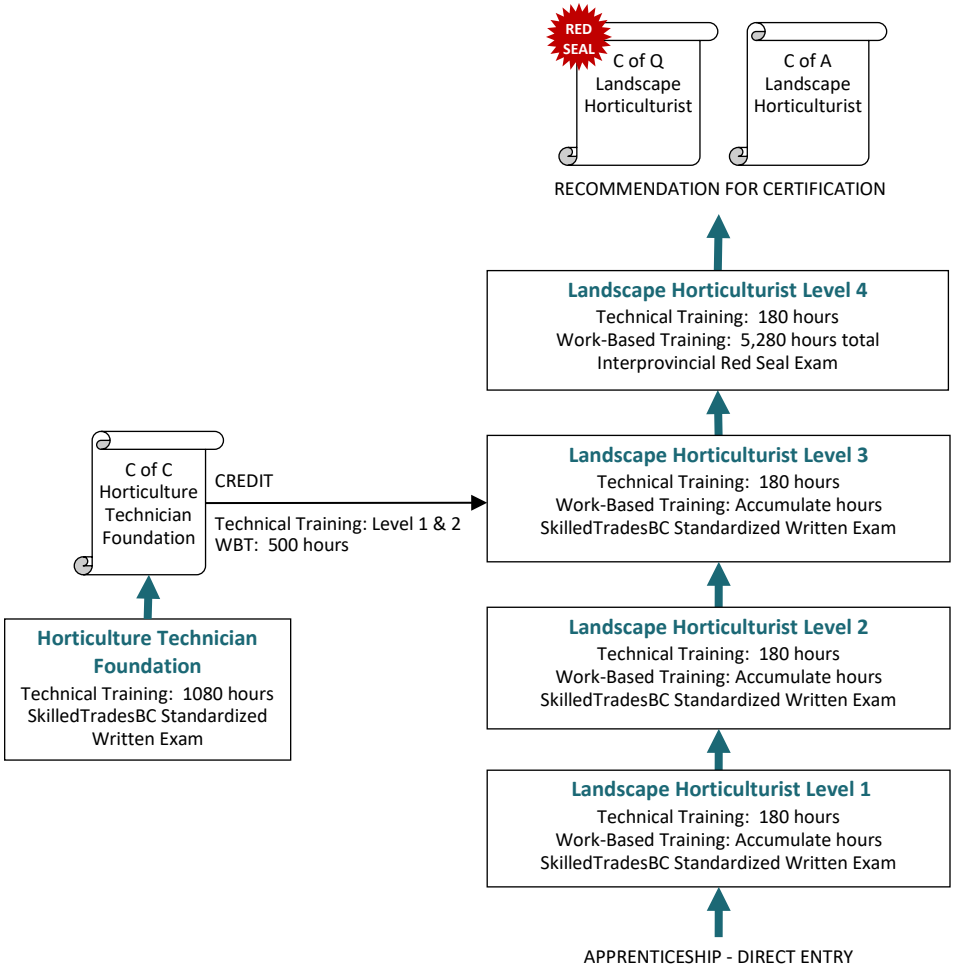
Landscape Horticulturist

Program Credentialing Model

Apprenticeship Pathway

This graphic provides an overview of the Landscape Horticulturist apprenticeship pathway.

C of Q = Certificate of Qualification
C of A = Certificate of Apprenticeship
C of C = Certificate of Completion
WBT = Work-Based Training



CROSS-PROGRAM CREDITS

Individuals who hold the credentials listed below are entitled to receive partial credit toward the completion requirements of this program

Certified Landscape Horticulturist Technician (CLHT) in Ornamental Maintenance plus one other module within the Certified Landscape Horticulturist Technician certification	Technical Training: None Work-Based Training: 1,000 hours

Occupational Analysis Chart

LANDSCAPE HORTICULTURIST

Occupation Description: "Landscape Horticulturists" identify, propagate, cultivate, grow and maintain plants, and manage injured and diseased trees and plants. They create and modify landscapes by measuring, designing, and interpreting plans. They construct and maintain gardens, parks, golf courses and other landscape environments. Landscape horticulturists install and maintain hard landscape elements such as retaining walls, patios, walkways and water features. In addition, they advise clients on issues related to horticulture and landscape construction. They are employed by landscape designers, architects and contractors, lawn service and tree care establishments, recreation facilities, golf courses, parks, nurseries, greenhouses, and municipal, provincial and federal governments. They may also be self-employed.

PERFORM SAFETY-RELATED FUNCTIONS **A**	Use personal protective equipment (PPE) and safety equipment A1	1					Maintain safe work environment A2	1											
USE TOOLS, EQUIPMENT AND VEHICLES **B**	Use hand tools B1	1	2	3			Use power tools B2	1	2	3			Use measuring equipment B3	1	2	3			Use vehicles and motorized equipment, trailers and attachments B4	1	2	3		
ORGANIZE WORK **C**	Perform site assessments C1	1	2	3	4		Use documentation and reference material C2	1	2	3	4		Maintain records C3	1	2	3	4		Participate in job planning activities C4			3	4		Order materials C5			3			Organize materials and equipment C6		2	3		
	Transport materials C7	1	2				Transport equipment C8	1	2																						
PARTICIPATE IN MARKETING AND SALES **D**	Control inventory D1			3			Sell products and services D2			3			Maintain customer relations D3			3			Prepare estimates D4				4								

USE COMMUNICATION AND MENTORING TECHNIQUES	**E**	Use communication techniques	E1	1			
		Use mentoring techniques	E2				4
APPLY HORTICULTURAL PRACTICES	**F**	Practice basic plant science	F1	1	2		
		Identify plants and plant requirements	F2	1	2	3	4
		Manage plant health and growing conditions	F3	1	2		
		Prune plant materials	F4		2	3	
		Manage pests, diseases and invasive species	F5			3	4
APPLY ENVIRONMENTAL PRACTICES	**G**	Practice environmental stewardship	G1	1	2	3	4
		Practice biodiversity enhancement	G2				4
		Practice soil stewardship	G3	1	2		
		Practice water stewardship	G4		2	3	
PERFORM PRE-CONSTRUCTION ACTIVITIES	**H**	Participate in landscape design activities	H1				4
		Prepare construction site	H2		2		
		Perform grading	H3	1			
		Install drainage systems	H4	1			
INSTALL HARDSCAPE	**I**	Install landscape structures	I1			3	
		Install surface materials	I2		2		
		Install steps and retaining walls	I3		2		
		Install irrigation systems	I4			3	
		Install water features	I5			3	
		Install low voltage landscape lighting	I6			3	
INSTALL SOFTSCAPE	**J**	Install growing media	J1	1			
		Install exterior landscape plants	J2		2		
		Transplant plants	J3		2		
		Install mulch	J4		2		
		Install turf from seed	J5	1			
		Install sod	J6	1			

	Install interior landscape plants J7				
			3		
INSTALL GREEN INFRASTRUCTURE SYSTEMS K	Select green infrastructure K1	Install green roofs and walls K2	Install rainwater and stormwater management systems K3	Install erosion control K4	Install biodiverse plantings and natural areas K5
			4		
MAINTAIN HARDSCAPE L	Maintain drainage systems L1	Maintain landscape structures L2	Maintain surface materials L3	Maintain steps and retaining walls L4	Maintain irrigation systems L5	Maintain water features L6
	2	3	2	2	3	3
	Maintain landscape lighting L7	Practice snow and ice control L8	Repair hardscape L9			
		3	3			
MAINTAIN SOFTSCAPE M	Maintain exterior softscape M1	Maintain interior softscape M2	Maintain turfgrass M3	Propagate plant materials M4	Repair softscape M5
	1 2	3	1	2	3
MAINTAIN GREEN INFRASTRUCTURE N	Maintain green roofs and walls N1	Maintain rainwater and stormwater management systems N2	Maintain erosion control N3	Maintain biodiverse plantings and natural areas N4	
			4		

Training Topics and Suggested Time Allocation: Level 1

LANDSCAPE HORTICULTURIST – LEVEL 1

			% of Time Allocated to:		
		% of Time	Theory	Practical	Total
Line A	**PERFORM SAFETY-RELATED FUNCTIONS**	**2%**	**40%**	**60%**	**100%**
A1	Use personal protective equipment (PPE) and safety equipment		✓	✓	
A2	Maintain safe work environment		✓	✓	
Line B	**USE TOOLS, EQUIPMENT AND VEHICLES**	**8%**	**30%**	**70%**	**100%**
B1	Use hand tools		✓	✓	
B2	Use power tools		✓	✓	
B3	Use measuring equipment		✓	✓	
B4	Use vehicles and motorized equipment, trailers and attachments		✓	✓	
Line C	**ORGANIZE WORK**	**6%**	**70%**	**30%**	**100%**
C1	Perform site assessments		✓	✓	
C2	Use documentation and reference material		✓	✓	
C3	Maintain records		✓	✓	
C7	Transport materials		✓	✓	
C8	Transport equipment		✓	✓	
Line E	**USE COMMUNICATION AND MENTORING TECHNIQUES**	**3%**	**80%**	**20%**	**100%**
E1	Use communication techniques		✓	✓	
Line F	**APPLY HORTICULTURAL PRACTICES**	**28%**	**60%**	**40%**	**100%**
F1	Practice basic plant science		✓	✓	
F2	Identify plants and plant requirements		✓	✓	
F3	Manage plant health and growing conditions		✓	✓	
Line G	**APPLY ENVIRONMENTAL PRACTICES**	**17%**	**90%**	**10%**	**100%**
G1	Practice environmental stewardship		✓	✓	
G3	Practice soil stewardship		✓	✓	
Line H	**PERFORM PRE-CONSTRUCTION ACTIVITIES**	**12%**	**40%**	**60%**	**100%**
H3	Perform grading		✓	✓	
H4	Install drainage systems		✓	✓	
Line J	**INSTALL SOFTSCAPE**	**7%**	**30%**	**70%**	**100%**
J1	Install growing media		✓	✓	
J5	Install turf from seed		✓	✓	
J6	Install sod		✓	✓	
Line M	**MAINTAIN SOFTSCAPE**	**17%**	**20%**	**80%**	**100%**
M1	Maintain exterior softscape		✓	✓	

			% of Time Allocated to:		
		% of Time	Theory	Practical	Total
M3	Maintain turfgrass		✓	✓	
	Total Percentage for Landscape Horticulturist Level 1	**100%**			

Training Topics and Suggested Time Allocation: Level 2

LANDSCAPE HORTICULTURIST – LEVEL 2

			% of Time Allocated to:		
		% of Time	Theory	Practical	Total
Line B	**USE TOOLS, EQUIPMENT AND VEHICLES**	**7%**	**30%**	**70%**	**100%**
B1	Use hand tools		✓	✓	
B2	Use power tools		✓	✓	
B3	Use measuring equipment		✓	✓	
B4	Use vehicles and motorized equipment, trailers and attachments		✓	✓	
Line C	**ORGANIZE WORK**	**8%**	**60%**	**40%**	**100%**
C1	Perform site assessments		✓	✓	
C2	Use documentation and reference material		✓	✓	
C3	Maintain records		✓	✓	
C6	Organize materials and equipment		✓	✓	
C7	Transport materials		✓	✓	
C8	Transport equipment		✓	✓	
Line F	**APPLY HORTICULTURAL PRACTICES**	**38%**	**50%**	**50%**	**100%**
F1	Practice basic plant science		✓	✓	
F2	Identify plants and plant requirements		✓	✓	
F3	Manage plant health and growing conditions		✓	✓	
F4	Prune plant materials		✓	✓	
Line G	**APPLY ENVIRONMENTAL PRACTICES**	**16%**	**90%**	**10%**	**100%**
G1	Practice environmental stewardship		✓	✓	
G3	Practice soil stewardship		✓	✓	
G4	Practice water stewardship		✓	✓	
Line H	**PERFORM PRE-CONSTRUCTION ACTIVITIES**	**3%**	**50%**	**50%**	**100%**
H2	Prepare construction site		✓	✓	
Line I	**INSTALL HARDSCAPE**	**13%**	**30%**	**70%**	**100%**
I2	Install surface materials		✓	✓	
I3	Install steps and retaining walls				
Line J	**INSTALL SOFTSCAPE**	**7%**	**20%**	**80%**	**100%**
J2	Install exterior landscape plants		✓	✓	
J3	Transplant plants		✓	✓	
J4	Install mulch		✓	✓	
Line L	**MAINTAIN HARDSCAPE**	**2%**	**60%**	**40%**	**100%**
L1	Maintain drainage systems		✓	✓	
L3	Maintain surface materials		✓	✓	
L4	Maintain steps and retaining walls		✓	✓	

			% of Time Allocated to:		
		% of Time	Theory	Practical	Total
Line M	**MAINTAIN SOFTSCAPE**	**6%**	**30%**	**70%**	**100%**
M1	Maintain exterior softscape		✓	✓	
M4	Propagate plant materials		✓	✓	
	Total Percentage for Landscape Horticulturist Level 2	**100%**			

Training Topics and Suggested Time Allocation: Level 3

LANDSCAPE HORTICULTURIST – LEVEL 3

			% of Time Allocated to:		
		% of Time	Theory	Practical	Total
Line B	**USE TOOLS, EQUIPMENT AND VEHICLES**	**3%**	**20%**	**80%**	**100%**
B1	Use hand tools		✓	✓	
B2	Use power tools		✓	✓	
B3	Use measuring equipment		✓	✓	
B4	Use vehicles and motorized equipment, trailers and attachments		✓	✓	
Line C	**ORGANIZE WORK**	**9%**	**50%**	**50%**	**100%**
C1	Perform site assessments		✓	✓	
C2	Use documentation and reference material		✓	✓	
C3	Maintain records		✓	✓	
C4	Participate in job planning activities		✓	✓	
C5	Order materials		✓	✓	
C6	Organize materials and equipment		✓	✓	
Line D	**PARTICIPATE IN MARKETING AND SALES**	**2%**	**100%**	**0%**	**100%**
D1	Control inventory		✓		
D2	Sell products and services		✓		
D3	Maintain customer relations		✓		
Line F	**APPLY HORTICULTURAL PRACTICES**	**45%**	**60%**	**40%**	**100%**
F2	Identify plants and plant requirements		✓	✓	
F4	Prune plant materials		✓	✓	
F5	Manage pests, diseases and invasive species		✓	✓	
Line G	**APPLY ENVIRONMENTAL PRACTICES**	**6%**	**90%**	**10%**	**100%**
G1	Practice environmental stewardship		✓	✓	
G4	Practice water stewardship		✓	✓	
Line I	**INSTALL HARDSCAPE**	**25%**	**30%**	**70%**	**100%**
I1	Install landscape structures		✓	✓	
I4	Install irrigation systems		✓	✓	
I5	Install water features		✓	✓	
I6	Install low voltage landscape lighting		✓	✓	
Line J	**INSTALL SOFTSCAPE**	**2%**	**30%**	**70%**	**100%**
J7	Install interior landscape plants		✓	✓	
Line L	**MAINTAIN HARDSCAPE**	**5%**	**70%**	**30%**	**100%**
L2	Maintain landscape structures		✓	✓	
L5	Maintain irrigation systems		✓	✓	
L6	Maintain water features		✓	✓	

			% of Time Allocated to:		
		% of Time	Theory	Practical	Total
L7	Maintain landscape lighting		✓	✓	
L8	Practice snow and ice control		✓	✓	
L9	Repair hardscape		✓	✓	
Line M	**MAINTAIN SOFTSCAPE**	**3%**	**80%**	**20%**	**100%**
M2	Maintain interior softscape		✓	✓	
M5	Repair softscape		✓	✓	
	Total Percentage for Landscape Horticulturist Level 3	**100%**			

Training Topics and Suggested Time Allocation: Level 4

LANDSCAPE HORTICULTURIST – LEVEL 4

			% of Time Allocated to:		
		% of Time	Theory	Practical	Total
Line C	**ORGANIZE WORK**	**9%**	**60%**	**40%**	**100%**
C1	Perform site assessments		✓	✓	
C2	Use documentation and reference material		✓	✓	
C3	Maintain records		✓	✓	
C4	Participate in job planning activities		✓	✓	
Line D	**PARTICIPATE IN MARKETING AND SALES**	**11%**	**70%**	**30%**	**100%**
D4	Prepare estimates		✓	✓	
Line E	**USE COMMUNICATION AND MENTORING TECHNIQUES**	**4%**	**80%**	**20%**	**100%**
E2	Use mentoring techniques		✓	✓	
Line F	**APPLY HORTICULTURAL PRACTICES**	**23%**	**50%**	**50%**	**100%**
F2	Identify plants and plant requirements		✓	✓	
F5	Manage pests, diseases and invasive species		✓	✓	
Line G	**APPLY ENVIRONMENTAL PRACTICES**	**3%**	**90%**	**10%**	**100%**
G1	Practice environmental stewardship		✓	✓	
G2	Practice biodiversity enhancement		✓	✓	
Line H	**PERFORM PRE-CONSTRUCTION ACTIVITIES**	**13%**	**60%**	**40%**	**100%**
H1	Participate in landscape design activities		✓	✓	
Line K	**INSTALL GREEN INFRASTRUCTURE SYSTEMS**	**28%**	**85%**	**15%**	**100%**
K1	Select green infrastructure		✓		
K2	Install green roofs and walls		✓		
K3	Install rainwater and stormwater management systems		✓		
K4	Install erosion control		✓	✓	
K5	Install biodiverse plantings and natural areas		✓	✓	
Line N	**MAINTAIN GREEN INFRASTRUCTURE**	**7%**	**90%**	**10%**	**100%**
N1	Maintain green roofs and walls		✓		
N2	Maintain rainwater and stormwater management systems		✓		
N3	Maintain erosion control		✓	✓	
N4	Maintain biodiverse plantings and natural areas		✓	✓	
	Total Percentage for Landscape Horticulturist Level 4	**100%**			

Section 3

PROGRAM CONTENT

Landscape Horticulturist

Level 1

Landscape Horticulturist

Line (GAC): A PERFORM SAFETY-RELATED FUNCTIONS

Competency: A1 Use personal protective equipment (PPE) and safety equipment

Objectives

To be competent in this area, the individual must be able to:

- Demonstrate personal safety in the workplace.
- Demonstrate proper use of PPE.
- Describe the procedure for using a fire extinguisher.
- Identify jurisdictional regulations.

LEARNING TASKS	CONTENT
1. Select and use PPE as required for task, tools, equipment, machinery and environment	• Ear protection • Eye protection • Hand protection • Foot protection • Safety vests • Respiratory protection • Fall protection
2. Inspect PPE prior to use	• Operation • Condition
3. Store PPE to maintain its integrity	• Dry • Protected • Clean
4. Describe the process to check PPE inventory	• Ready supply
5. Recognize damaged and expired PPE	• Expiration dates • Integrity of PPE
6. Check and replace PPE components	• According to manufacturers' specifications • According to workplace requirements • According to jurisdictional regulations
7. Recognize PPE requirements for chemical handling	• Goggles • Rubber gloves • Face shields • Chemical protection suits
8. Describe the procedure for using a fire extinguisher	• Conditions to support a fire • Classes of fires • Extinguisher selection • Use
9. Demonstrate knowledge of regulatory requirements pertaining to PPE and safety equipment	• Jurisdictional regulations

Achievement Criteria

Performance	The learner will select PPE for specified tasks.
Conditions	The learner will have access to PPE commonly used in the trade.
Criteria	The learner will score a passing grade of 70% or better on a rating sheet according to the following criteria: • Selected correct PPE required for specified tasks as designated by the instructor

Line (GAC): A PERFORM SAFETY-RELATED FUNCTIONS

Competency: A2 Maintain safe work environment

Objectives

To be competent in this area, the individual must be able to:

- Assess site hazards and potential risks.
- Follow specified safety procedures.
- Follow WHMIS procedures.

LEARNING TASKS	CONTENT

1. Assess site hazards and potential risks	• Motorized equipment
	• High voltage
	• Working at heights
	• Overhead
	• Ergonomic
	• Gravitational
	  ○ Slips
	  ○ Trips
	  ○ Falls
	• Public
	• Personnel
	  ○ Fatigue
	  ○ Rushing
	  ○ Complacency
	  ○ Stress
	  ○ Substance abuse
	  ○ Ignorance
	  ○ Frustration
	  ○ Heat and cold stress
	• Chemical
	  ○ Tanks
	  ○ Hazardous and toxic debris
	• Environmental
	  ○ Insects
	  ○ Plants
	  ○ Weather
	  ○ Hazardous trees

2. Coordinate task with other workers	• Injury avoidance
	  ○ Self
	  ○ Co-workers
	  ○ Others

3. Maintain worksite to avoid injuries to self and others	• Clean • Tidy
4. Use safety barriers when working in traffic areas	• Flagging

LEARNING TASKS	CONTENT
	• Pylons • Signage
5. Participate in safety meetings and discussion	• Information recorded and distributed to all team members
6. Report unsafe conditions to supervisor	• Recognizing • Reporting
7. Recognize safety warning signals	• Back-up signals • Back-up alarms • Warning lights • Universal hand signals
8. Recognize safety symbols	• Workplace and job-site safety signage • Truck signage • Product labels
9. Describe considerations to coordinate with other agencies	• Private and public line locators • Emergency response teams
10. Describe how to mitigate the risks of workplace accidents and injuries	• Visual assessments • Safe work plan • Post-job inspection
11. Describe WHMIS requirements	• Certification • Pictograms • Labels
12. Handle hazardous materials in accordance with government regulations and WHMIS procedures	• Contain • Dispose • Label • PPE
13. Identify relevant WorkSafeBC regulations	• Lock-out/tag-out • Confined spaces • Reporting • Responsibilities of employer and supervisor

Line (GAC): B USE TOOLS, EQUIPMENT AND VEHICLES

Competency: B1 Use hand tools

Objectives

To be competent in this area, the individual must be able to:

- Use and maintain hand tools.
- Store hand tools.

LEARNING TASKS	CONTENT
1. Select and use hand tools	• See the general list of Tools and Equipment and the tool list that is specific for Level One, detailed in the Training Provider Standards of this Program Outline • Environmental implications
2. Perform hand tool maintenance (for level appropriate tools)	• Cleaning and disinfecting • Lubricating • Damage • Excessive wear • Proper operation • Sharpening • Replacing components
3. Store hand tools (for level appropriate tools)	• Organization • Safety • Security • Preservation

Line (GAC): B USE TOOLS, EQUIPMENT AND VEHICLES

Competency: B2 Use power tools

Objectives

To be competent in this area, the individual must be able to:

- Use and maintain power tools.
- Store power tools.

LEARNING TASKS	CONTENT
1. Select and use power tools	• See the general list of Tools and Equipment and the tool list that is specific for Level One, detailed in the Training Provider Standards of this Program Outline • Adjusting • Manufacturer's specifications • Environmental implications • Removal from service ○ Company policy • Safety features

2. Perform power tool maintenance (for level appropriate tools)	• Operational maintenance
	  ○ Cleaning and disinfecting
	  ○ Lubricating
	  ○ Fluid levels
	  ○ Tire pressure
	  ○ Adjusting
	  ○ Damage
	  ○ Excessive wear
	  ○ Malfunction
	  ○ Proper operation
	  ○ Sharpening
	  ○ Balancing
	  ○ Replacing components
	  ○ Cooling fins
	  ○ Maintenance schedule
	  ○ Manufacturers' specifications
	  ○ Safety features
	• Preventative maintenance
	  ○ Fuel
	  ○ Filters
	  – Air
	  – Fuel
	  ○ Lubrication
	  – Oil
	  – Grease
	  ○ Spark plug

LEARNING TASKS	CONTENT
	○ Controls and drive mechanisms ○ Bolts, belts, fittings, hoses ○ Tire pressure ○ Batteries
3. Store power tools (for level appropriate tools)	• Organization • Safety • Security • Preservation

Line (GAC): B USE TOOLS, EQUIPMENT AND VEHICLES

Competency: B3 Use measuring equipment

Objectives

To be competent in this area, the individual must be able to:

- Use and maintain measuring equipment.
- Store measuring equipment.

LEARNING TASKS	CONTENT
1. Select and use measuring equipment	• See the general list of Measuring Equipment and the specific list of Measuring Equipment for Level One, detailed in the Training Provider Standards of this Program Outline
2. Perform maintenance on measuring equipment (for level appropriate equipment)	• Cleaning and disinfecting • Proper operation • Contaminants • Calibrating • Batteries • Damage • Excessive wear • Proper operation
3. Store measuring equipment (for level appropriate equipment)	• Organization • Safety • Security • Manufacturer's specifications

Line (GAC): B USE TOOLS, EQUIPMENT AND VEHICLES

Competency: B4 Use vehicles and motorized equipment, trailers and attachments

Objectives

To be competent in this area, the individual must be able to:

- Identify basic engine systems.
- Discuss pre-operation checks, maintenance and repair.
- Clean and inspect vehicles, motorized equipment, attachments and trailers.
- Operate vehicles and motorized equipment.

LEARNING TASKS	CONTENT
1. Identify basic engine systems	• Diesel • Electric • Two-cycle • Four-cycle

2. Inspect vehicles, motorized equipment, attachments and trailers	• Equipment
	  ○ Turfgrass maintenance
	  ○ Utlility vehicles
	• Defects
	• Damage
	• Wear
	• Safety features

3. Operate vehicles and motorized equipment	• Equipment
	  ○ Turfgrass maintenance
	  – Cutting height
	  ○ Utlility vehicles
	• Jurisdictional regulations
	• Manufacturer's specifications
	• Company policy
	• Three point contact

4. Clean vehicles, motorized equipment, attachments and trailers	• Disinfection • Appearance • Leaks • Sanitation • Site conditions • Jurisdictional regulations

5. Discuss the procedures for pre-operation check and maintenance	• Safety features
	  ○ Lock-out devices
	  ○ Chutes
	  ○ Guards
	  ○ Rollover protection devices (ROP)
	  ○ Operator presence switches

LEARNING TASKS	CONTENT
	○ Jurisdictional regulations • Maintenance checks • Circle checks • Cold starts • Changing seasonal tires • Fluid levels • Lubricants • Components • Air pressure • Connections, fittings and hoses • Manufaturer's specifications • Company policy
6. Discuss equipment maintenance and repairs	• Damaged and worn components ○ Spark plugs ○ Belts ○ Hoses ○ Pull cords ○ Bushings ○ Blades ○ Tines

Line (GAC): C ORGANIZE WORK

Competency: C1 Perform site assessments

Objectives

To be competent in this area, the individual must be able to:

- Inspect site and determine requirements.
- Assess soils.
- Examine soil compaction.
- Identify existing and proposed grading and drainage patterns.

LEARNING TASKS	CONTENT

1. Select and use specific tools and equipment as directed	• Tools
	  ○ Soil probe
	  ○ Shovels
	  ○ Rakes

2. Perform visual inspection	• Site • Neighbouring properties
3. Assess access points	• Site restrictions • Challenges for work
4. Identify security requirements	• Theft protection • Risk of vandalism • Human health and safety • Wildlife
5. Assess landscape site soils	• Soil or growing media depth • Soil quality concepts

6. Examine soil compaction and drainage	• Impact of compaction
	  ○ Soil permeability
	  ○ Drainage

7. Identify existing and proposed grading and drainage patterns	• Visual inspection
	  ○ Positive drainage
	  ○ Slope

Line (GAC): C ORGANIZE WORK

Competency: C2 Use documentation and reference material

Objectives

To be competent in this area, the individual must be able to:

- Reference and interpret relevant documentation.

LEARNING TASKS	CONTENT

1. Reference documentation pertaining to worker safety	• WHMIS
	  ○ SDS
	• WorkSafeBC
	• Company policy
	• Jurisdictional regulations
	  ○ Employment standards

2. Reference documentation pertaining to industry standards	• CLS • Material specifications
3. Reference additional information resources	• Textbooks • Fieldbooks • Operator equipment manuals • Internet ○ Resource credibility
4. Interpret location documentation	• Locate utility lines (BC One Call) • Other services

Line (GAC): C ORGANIZE WORK

Competency: C3 Maintain records

Objectives

To be competent in this area, the individual must be able to:

- Describe the types of tool and equipment records.
- Describe the purpose of completing safety records.

LEARNING TASKS	CONTENT
1. Describe the types of tool and equipment records	• Sign-out records • Training sign-off sheets • Maintenance records • Calibration records

2. Describe the purpose of completing safety records	• Company accountability
	  ○ Accident reports
	  ○ Lock out/ tag out
	  ○ Safety meeting sheets
	• Regulations
	  ○ Governmental
	  ○ Industry
	  ○ Company

Line (GAC): C ORGANIZE WORK

Competency: C7 Transport materials

Objectives

To be competent in this area, the individual must be able to:

- Describe the procedure to cover and secure materials.
- Describe the procedure to load/unload materials.

LEARNING TASKS	CONTENT
1. Describe the protection of plant materials	• Tarps • Anti-desiccants • Enclosed trailers • CLS
2. Describe the procedure to secure materials	• Approved tie-downs • Jurisdictional regulations • Loose materials • Hazardous materials • Spillage prevention

3. Describe the procedure to load/unload materials	• Tools and equipment
	  ○ Dollies
	  ○ Forklifts
	• Optimal transport
	• Sequence
	• Direction
	• Weight distribution
	• Jurisdictional regulations
	  ○ Gross vehicle weight ratings

4. Describe the procedure to cover materials	• Jurisdictional regulations • Company policy

Line (GAC): C ORGANIZE WORK

Competency: C8 Transport equipment

Objectives

To be competent in this area, the individual must be able to:

- Describe the procedure to secure loads.
- Describe the procedure to load and unload equipment.

LEARNING TASKS	CONTENT
1. Describe the selection of vehicle/trailer type	• Equipment ○ Attachments • Weight restrictions • Licensing requirements
2. Describe the procedure to secure loads	• Approved tie-downs • Jurisdictional regulations • Shifting
3. Describe the procedure to load equipment	• Flags and signs • Ramps • Traffic cones • Blocks • Company policy • Jurisdictional regulations

4. Describe the procedure to unload equipment	• Location
	• Proximity to work area
	• Level ground
	• Vehicle/trailer stabilization
	  ○ Traffic cones
	  ○ Blocks
	• Company policy
	• Jurisdictional regulations

Line (GAC): E USE COMMUNICATION AND MENTORING TECHNIQUES

Competency: E1 Use communication techniques

Objectives

To be competent in this area, the individual must be able to:

- Describe effective group functioning.
- Use effective verbal and written communication.

LEARNING TASKS	CONTENT
1. Describe characteristics of an effective team	• High performing crew/team • Ineffective work crews • Supervisory role
2. Participate in safety and information meetings	• Preparation • Attendance • Participation
3. Describe conflict management	• Defining conflict • Sources of conflict • Basic styles for managing conflict • Conflict management strategies • Guidelines of managing interpersonal conflict

4. Use effective verbal and written communication techniques	• Basic communication skills
	  ○ Listening
	  ○ Speaking
	  ○ Reading
	  ○ Writing
	• Active listening
	• Mirroring
	• Repeating back
	• Reporting discrepancies and seeking direction from supervisor
	• Non-verbal communication
	• Barriers to communication
	• Relaying information
	  ○ Co-workers
	  ○ Clients
	  ○ Suppliers
	  ○ Office staff
	• Relaying information in laypersons' terms
	  ○ Clients
	  ○ Public

5. Describe effective feedback	• Giving • Receiving

LEARNING TASKS	CONTENT
6. Describe the use of communication equipment	• Responding • Two-way radios • Computers • Cell phones

7. Use universal hand signals	• Other tradespeople
	  ○ Machine operators
	  ○ Truckers
	  ○ Crane operators
	• Jurisdictional regulations

Line (GAC): F APPLY HORTICULTURAL PRACTICES

Competency: F1 Practice basic plant science

Objectives

To be competent in this area, the individual must be able to:

- Explain plant morphological characteristics, life cycles, and adaptions as they apply to plant identification, plant propagation, arboriculture and turf maintenance.

LEARNING TASKS	CONTENT
1. Describe the external anatomy of stems	• Woody • Herbaceous
2. Describe leaf morphology and external anatomy	• Parts of a simple leaf • Leaf shapes • Leaf tips • Leaf margins • Leaf surfaces • Pattern of veins within the leaf blade • Simple and compound leaves

3. Describe parts of the flower	• Flower structure
	  ○ Complete and incomplete flowers
	  ○ Perfect vs. imperfect flowers
	  ○ Monoecious vs. dioecious plants
	  ○ Flower symmetry

4. Identify typical inflorescences	• Types
5. Identify fruit types	• Fleshy • Dry ○ Dehiscent and indehiscent

6. Describe seed characteristics and development	• Parts of a seed
	• Germination requirements
	  ○ Basic
	  ○ Special treatments
	• Monocot vs. dicot germination
	• Dormancy and viability

7. Identify organ modifications	• Stems, leafs, roots
	• Reasons
	  ○ Storage
	  ○ Protection
	  ○ Propagation
	  ○ Stressors
	  ○ Environmental

Line (GAC): F APPLY HORTICULTURAL PRACTICES

Competency: F2 Identify plants and plant requirements

Objectives

To be competent in this area, the individual must be able to:

- Identify plant and plant requirements for 50 woody and non-woody plants.
- Identify morphological characteristics, growing requirements, use and availability.

LEARNING TASKS	CONTENT

1. Classify a range of plant materials commonly used in horticulture	• Life cycle of a plant
	• Plant growth patterns
	  ○ Annuals
	  ○ Biennials
	  ○ Perennials
	  ○ Herbaceous perennials
	  ○ Woody perennials
	• Deciduous and evergreen plants
	  ○ Deciduous plants
	  ○ Evergreens
	  ○ Broadleaf evergreens
	  ○ Coniferous evergreens
	• Climbing plants
	  ○ Stems specialized for climbing
	  ○ Monocarpic plants

2. Employ correct naming and plant identification terminology	• Origin of plant naming systems
	  ○ Common names
	  ○ Nomenclature
	  ○ Binomial system for naming plants
	  ○ Plant taxonomy
	  ○ Writing botanical names

3. Name the plant family for each plant identified	• Plant families
	• Plant families commonly found in British Columbia
	  ○ ASTERACEAE – Aster Family
	  ○ CARYOPHYLLACEAE – Pink Family
	  ○ ERICACEAE – Heath Family
	  ○ LAMIACEAE – Mint Family
	  ○ LILIACEAE – Lily Family
	  ○ RANUNCULACEAE – Buttercup Family
	  ○ ROSACEAE – Rose Family
	  ○ SAPINDACEAE – Soapberry Family

LEARNING TASKS	CONTENT
4. Describe bud, bark, foliage, flower and fruit characteristics	• Plant morphology • Morphology descriptors for leaves • Leaf arrangement • Needles • Scales and awls • Patterns of inflorescence • Descriptors for flowers • Plant types • Descriptors for fruit • Woody stems • Visual, touch and other senses • Health and vigour
5. Use a dichotomous key for plant identification	• Limitations of plant keys • Conifer key • Deciduous key
6. Identify and describe 50 woody and non-woody plants	• Using botanical terms • According to its cultural and maintenance requirements

Line (GAC): F APPLY HORTICULTURAL PRACTICES

Competency: F3 Manage plant health and growing conditions

Objectives

To be competent in this area, the individual must be able to:

- Describe the conditions and practices that affect plant health.
- Examine plant organs for signs of stress.

LEARNING TASKS	CONTENT
1. Select and use tools and equipment	• Hand lens • Soil probe • Light meter • pH meter • Tensiometer • Spreaders

2. Describe the conditions that affect plant health	• Environmental
	  ○ Air quality
	  – Ozone
	  – pollutants
	  ○ Light
	  ○ Humidity
	  ○ Wind
	  ○ HVAC systems
	  ○ Temperature
	  ○ Moisture
	  ○ Reflective heat load
	• Growing
	  ○ Microclimate
	  ○ Available space
	  ○ Plant hardiness
	  ○ Topography
	  ○ Soil type
	  ○ Depth
	  ○ pH level
	  ○ Water availability

3. Recognize basic practices that affect plant health	• IPM principles • Maintenance practices • Installation practices • Canadian Standards for Nursery Stock (CSNS)
4. Visually inspect growing media	• Signs of and symptoms of health • Determining needs of growing media
5. Use appropriate terminology to describe plant stress	• Signs • Symptoms

LEARNING TASKS	CONTENT

6. Examine plant organs for evidence of stress	• Abiotic
	  ○ Nutrient deficiencies
	  ○ Environmental conditions
	• Biotic
	  ○ Diseases
	  ○ Pests

Line (GAC): G APPLY ENVIRONMENTAL PRACTICES

Competency: G1 Practice environmental stewardship

Objectives

To be competent in this area, the individual must be able to:

- Define environmental stewardship.
- Discuss standards and opportunities for stewardship related to site assessment and preparation.

LEARNING TASKS	CONTENT

1. Define environmental stewardship	• Natural and urban habitats and ecosystems
	  ○ Conservation
	  ○ Preservation
	  ○ Reclamation
	  ○ Protection
	  ○ Function
	  ○ Purpose
	  – Psychosocial health
	  ○ Structure

2. Describe standards for environmental protection	• Silt fencing • Environmental construction practices • Material storage • Sourcing appropriate information relative to environmental protection
3. Discuss opportunities for stewardship related to site assessment and preparation	• Tools • Equipment • Plants • Materials • Disposal • Organized work flow • Site protection • Maintenance practices • Installation practices • Non-sustainable versus sustainable practices
4. List benefits of plants	• Carbon sequestration • Symbiotic relationships • Pollution mitigation • Cost savings • Aesthetics • Psychosocial health • Medicinal • Food source • Wildlife habitat • Building materials

Line (GAC): G APPLY ENVIRONMENTAL PRACTICES

Competency: G3 Practice soil stewardship

Objectives

To be competent in this area, the individual must be able to:

- Recognize soil and soil management as keys to the successful practice of horticulture.
- Describe the physical properties and behaviour of soil.

LEARNING TASKS	CONTENT

1. Describe factors of soil formation	• Natural soils
	  ○ Parent material
	  ○ Biotic – living organisms
	  ○ Topography
	  ○ Time
	• Manufactured soils

2. Define soil quality	• Human health • Environmental quality • Plant and animal productivity
3. Distinguish between soil profile horizons	• LFH horizon • A horizon • B horizon • C horizon • R horizon (Bedrock)

4. Explain the physical properties of soil and soilless media	• Texture
	• Structure
	  ○ Density
	  ○ Porosity
	  ○ Impact of cultivation
	  ○ Soil compaction
	  – Remediation

5. Describe the behaviour of water in soil	• Soil water holding capacity
	• Available water
	• Water movement through soil
	  ○ Gravity
	  ○ Capillary action
	• Wetting front
	• Hydraulic conductivity of soil
	• Water retention and flow in layered soils
	• Water movement in urban soils
	• Remediation of drainage and infiltration issues
	  ○ Subsurface drainage
	  ○ Mounded plant beds

LEARNING TASKS

CONTENT

- Raised plant beds
- Subsoil sculpturing

Achievement Criteria

Performance	The learner will perform soil tests.
Conditions	The learner will be given the necessary materials, tools and equipment.

Criteria	The learner will score a passing grade of 70% or better on a rating sheet according to the following criteria:
	• Performed tests on soil:
	  ○ Percolation
	  ○ Texture tests
	  ○ Topsoil depth

Line (GAC): H PERFORM PRE-CONSTRUCTION ACTIVITIES

Competency: H3 Perform grading

Objectives

To be competent in this area, the individual must be able to:

- Perform site grading.
- Describe the effects of grading.

LEARNING TASKS	CONTENT

1. Select and use tools and equipment	• Tools
	  ○ Builder's level
	  ○ Spirit level
	  ○ String level
	  ○ Water level
	  ○ Landscape rakes
	• Equipment
	  ○ Excavators
	  ○ Trenchers
	  ○ Skid steers

2. Describe the considerations for grading	• Terminology
	• Hazards
	• Site function
	• Specifications
	• Jurisdictional regulations
	• Grading plans
	  ○ Existing grades
	  ○ Proposed grades (finished)
	  ○ Contour plans
	• Verification

3. Perform calculations	• Elevation • Slope • Cut and fill
4. Describe the procedure to strip and stockpile topsoil	• Plans and specifications • CLS • Jurisdictional regulations
5. Perform site grading	• Cut and fill • Rough grading • Grading for drainage • Finish grading

6. Describe the effects of grading	• Environmental stewardship
	• Soils
	  ○ Erosion
	  ○ Compaction

LEARNING TASKS

CONTENT

- Site hydrology

Achievement Criteria

Performance	The learner will perform grading to achieve a specified slope.
Conditions	The learner will be given a plan, tools, equipment and materials.
Criteria	The learner will score a passing grade of 70% or better on a rating sheet according to the following criteria: • Performed calculations • Proper set up of equipment • Measurement of distance intervals • Perform rod readings • Determine elevations for grade • Setup and marked grade stakes • Perform grading

Line (GAC): H PERFORM PRE-CONSTRUCTION ACTIVITIES

Competency: H4 Install drainage systems

Objectives

To be competent in this area, the individual must be able to:

- Install a sub system drainage system using the correct tools, equipment and materials, as per specifications.

LEARNING TASKS	CONTENT

1. Select and use tools and equipment	• Tools
	  ○ Trenching shovels
	  ○ Picks
	  ○ Wheelbarrows
	  ○ Pipe cutter
	  ○ Glue
	• Equipment
	  ○ Excavators
	  ○ Trenchers

2. Describe the considerations for drainage system selection	• Hydrologic cycle
	• Precipitation
	  ○ Rain
	  ○ Snow
	• Runoff
	  ○ Overland flow
	  ○ Sub-surface flow
	  ○ Saturated overland flow
	  ○ Urbanization runoff
	• Soil texture and structure
	• Benefits of good drainage
	  ○ Plant health
	  ○ Root development
	  ○ Nutrient uptake
	  ○ Plant tolerance
	  ○ Pathogenic organisms
	• Over drained soils
	• General water table changes
	• Environmental stewardship
	• Topography
	• Jurisdictional regulations

3. Describe types of drainage systems	• Surface drainage systems
	  ○ Retention/detention ponds
	  ○ Rain gardens
	  ○ Open channels
	  ○ Ditches
	  ○ Swales

LEARNING TASKS	CONTENT

4. Describe drainage components and their function	• Subsurface drainage systems
	  ○ French drain
	  ○ Perimeter drain
	• Surface drainage system components
	  ○ Storm drains
	  ○ Utility hole covers
	  ○ Drain outlets
	  ○ Catch basins
	• Subsurface drainage system components
	  ○ Pipes
	  ○ Pipe envelope fabrics
	  ○ Blind inlets
	  ○ Bedding material
	  – Drain rock
	  – Washed sand

5. Describe drainage system planning and design considerations	• Plans
	  ○ Drainage
	  ○ Grading
	• Drainage system capacity
	• Subsurface drainage
	  ○ Drain depth and spacing
	  ○ Drain diameter
	  ○ Grades for drains
	  ○ Installation of sub-surface drains
	• Surface drainage
	  ○ Land grading
	• Velocities
	• CLS
	• Jurisdictional regulations
	• Site protection

6. Perform drainage system installation	• Elevation and slope calculations • Subsoil excavation • Storage or removal of excavated materials • Layout, assembly and placement of drainage components • Verification of drainage system operation • Drainage system backfilling • Verification that installation meets specifications • CLS • Jurisdictional regulations

Achievement Criteria

Performance	The learner will install a sub-surface drainage system.
Conditions	The learner will be given a plan, tools, equipment and materials.
Criteria	The learner will score a passing grade of 70% or better on a rating sheet according to the following criteria: • Sub grade properly prepared • Drain installed at proper grade • Correct size drain and type of aggregate used • Drain placed to correct depth • Filter fabric properly installed

Line (GAC): J INSTALL SOFTSCAPE

Competency: J1 Install growing media

Objectives

To be competent in this area, the individual must be able to:

- Install growing media using the correct tools, equipment and materials, as per specifications.

LEARNING TASKS	CONTENT

1. Select and use hand tools	• Tools
	  ○ Shovels
	  ○ Picks
	  ○ Rakes
	  ○ Wheelbarrows

2. Select and use equipment	• Equipment
	  ○ Skid steers
	  ○ Loaders
	  ○ Excavators
	  ○ Truck blowers

3. Verify functioning of drainage systems	• Surface • Subsurface
4. Scarify subsoil	• Soil layering • Glazing • Nutrient cycling
5. Add growing media	• Drawings and specifications • Lifts • Standards for compaction • Irrigation • Soil and soilless media • Depth
6. Add and incorporate amendments	• Fertilizers • Composts • Peat moss • Mycorrhizae • Soil test results
7. Shape and grade growing media	• Standards, drawings and specifications

Line (GAC): J INSTALL SOFTSCAPE

Competency: J5 Install turf from seed

Objectives

To be competent in this area, the individual must be able to:

- Install turf from seed using the correct tools, equipment and materials, as per specifications.

LEARNING TASKS	CONTENT

1. Select and use hand tools	• Tools
	  ○ Rollers
	  ○ Landscape rakes
	  ○ Seed spreaders

2. Select and use equipment	• Equipment
	  ○ Hydro-seeders
	  ○ Seed drills
	  ○ Tractors and attachments

3. Describe turfgrass functions and standards for quality	• Functions of lawns
	  ○ Recreational use
	  ○ Aesthetic use
	  ○ Environmental function
	• Turf quality
	  ○ Visual turf quality
	  ○ Functional turf quality

4. Describe turfgrass nutrition and application technology	• Nutrition and soil amendments
	  ○ Roles of nitrogen, phosphorous and potassium
	• Selection of fertilizer products
	  ○ Coated fertilizers
	  ○ Synthetic organic sources/natural organic sources
	• Fertiilzer calculations
	  ○ Cost of nutrient/product and cost of nutrient/site
	  ○ Application technology
	  ○ Calibration of drop rotary spreaders

5. Describe turfgrass and water use	• Water use
	  ○ Water use characteristics in common turfgrass
	  ○ Turfgrass with drought resistance ranking
	• Symptoms of water stress
	• Irrigation monitoring strategies

6. Describe turfgrass selection and identification	• Common turfgrass species and blends • Standards for species selection

LEARNING TASKS	CONTENT
	○ Perennial ryegrass ○ Annual ryegrass ○ Annual bluegrass ○ Kentucky bluegrass ○ Fine fescues ○ Creeping bentgrass ○ Colonial bentgrass • Seed quality ○ The national turfgrass evaluation program ○ Certified and common seed ○ Jurisdictional regulations ○ Standards ○ Seed germination ○ Seed purity ○ Calculating pure live seed (PLS)
7. Prepare seedbed	• Grading • Debris removal • Soil depth • Compaction • Amendments ○ Lime ○ Peat moss ○ Mycorrhizae • Irrigation • Scarify • Standards and specifications
8. Verify seed variety and seeding rate	• Manufacturer's specifications ○ Application rate ○ Seed variety • Calibration
9. Apply seed to prepared area	• Landscape rollers • Seed distribution • Uniform and targeted application • Weather conditions ○ Wind ○ Temperature ○ Precipitation • Organic matter application ○ Moisture retention ○ Seed mobility ○ Erosion control
10. Describe procedures for post-seeding care	• Irrigation

LEARNING TASKS	CONTENT
	• Weeding • Reapplication • Establishment

Line (GAC): J INSTALL SOFTSCAPE

Competency: J6 Install sod

Objectives

To be competent in this area, the individual must be able to:

- Install sod using the correct tools, equipment and materials, as per specifications.

LEARNING TASKS	CONTENT

1. Select and use hand tools	• Tools
	  ○ Rollers
	  ○ Landscape rakes
	  ○ Sod knives

2. Select and use equipment	• Equipment
	  ○ Rollers
	  ○ Tractors and attachments

3. Describe turfgrass functions and characteristics for quality	• Functions of lawns
	  ○ Recreational use
	  ○ Aesthetic use
	  ○ Environmental function
	• Turf quality
	  ○ Visual turf quality
	  ○ Functional turf quality

4. Prepare the area to be sodded	• Grading
	• Debris removal
	• Utility marking
	• Soil depth
	• Compaction
	• Amendments
	  ○ Lime
	  ○ Peat moss
	  ○ Mycorrhizae
	  ○ Fertilizers
	• Irrigation
	• Scarify
	• Standards and specifications

5. Verify sod	• Variety
	• Quality
	  ○ Standards
	  ○ Contract documents
	• Quantity

6. Lay sod	• Procedures
	  ○ Seams
	  ○ Orientation of sod

LEARNING TASKS	CONTENT
	– Grade – Shape and features – Minimal cuts • Landscape rollers • Drawings and specifications
7. Describe procedures for post-sod care	• Establishment o Root attachment o Plant health o Deficiencies – Pooling • Standards and specifications • Irrigation • Pest control • Jurisdictional regulations • First mow
8. Dispose of or recycle excess materials	• Jurisdictional regulations • Industry standard

Achievement Criteria

Performance	The learner will install sod.
Conditions	The learner will be given the necessary materials, tools and equipment.
Criteria	The learner will score a passing grade of 70% or better on a rating sheet according to the following criteria: • Verified area to be sodded is prepared according to specifications • Verified selected sod meets specifications • Laid according to specifications

Line (GAC): M MAINTAIN SOFTSCAPE

Competency: M1 Maintain exterior softscape

Objectives

To be competent in this area, the individual must be able to:

- Describe the purpose of exterior softscape maintenance.
- Describe the procedure for exterior softscape maintenance.
- Create a basic maintenance plan for an exterior softscape.

LEARNING TASKS	CONTENT
1. Select and use tools and equipment	• Rakes • Hoes • Spades • Shovels • Edgers • Hand pruners • Broom • Blowers • Hoses • Watering wand • Forks
2. Describe the purpose of softscape maintenance	• Landscape function • Landscape integrity • Design intent • Contract documents • Site specific • Plant preservation • Structure preservation
3. Perform visual inspection	• Plant health • Appearance • Maintenance levels • Contract documents
4. Describe plant irrigation	• Plant requirements • Water soil relationship • Annual • Automatic • Overhead • Drip • Jurisdictional regulations
5. Describe cultivation of growing media	• Soil structure and biota • Aesthetics • Ease of planting

LEARNING TASKS	CONTENT
	• Aeration • Weeding
6. Describe hardening-off practices	• Plant hardiness • Season • Weather • Standards
7. Perform bed edging	• Contract documents • Definition • Weed control

8. Describe inspection and maintenance of natural and manufactured edge	• Aesthetics
	• Edges
	  ○ Plastic
	  ○ Wood
	  ○ Metal
	  ○ Brick
	  ○ Stone

9. Remove weeds and debris	• Plant life cycles • Contract documents • Maintenance levels • IPM • Disposal • Jurisdictional regulations
10. Perform deadheading	• Contract documents • Appearance • Plant life cycles
11. Perform site cleanup	• Contract documents • Litter pickup • Removal of excess clippings • Surface cleaning • Jurisdictional regulations

Achievement Criteria

Performance	The learner will create a basic maintenance plan for an exterior softscape.
Conditions	The learner will be given the necessary materials, tools and equipment.
Criteria	The learner will score a passing grade of 70% or better on a rating sheet according to the following criteria: • Assessed the site • Identified problems • Created a maintenance plan

Line (GAC): M MAINTAIN SOFTSCAPE

Competency: M3 Maintain turfgrass

Objectives

To be competent in this area, the individual must be able to:

- Describe the maintenance of grass/turf according to specifications.
- Mow and trim turfgrass.
- Create a maintenance plan for grass/turf.

LEARNING TASKS	CONTENT
1. Select and use tools and equipment	• Power raking equipment • Reel and rotary mowers • Blade edgers • String trimmers • Core aerators • Verticutters • Slice seeders • Spreaders

2. Describe turfgrass cultivation	• Aeration
	• Topdressing
	• Overseeding
	  ○ Repair
	  ○ Rejuvinate
	  ○ Introduce new species
	• Thatch removal (de-thatching)
	• Soil test recommendations
	  ○ pH level
	  ○ Fertility

3. Describe maintenance scheduling	• Mowing frequency and height of cut • Length of maintenance season • Site use • Maintenance level • Fertilization

LEARNING TASKS	CONTENT

4. Describe the monitoring of turfgrass	• Visual inspection
	  ○ Colour
	  ○ Thinning
	  ○ Grades
	  ○ Drainage
	  ○ Pests and diseases
	  ○ Divots
	  ○ Patching
	  ○ Poor mowing quality
	  ○ Root zone concerns

5. Describe turfgrass irrigation	• Water management
	  ○ Timing
	  ○ Coverage
	  ○ Usage
	  ○ Species
	  ○ Environment conditions
	  ○ Jurisdictional regulations
	  ○ Contract documents

6. Perform mowing and trimming of turfgrass	• Cutting heights • Mower sanitation • Frequency • Procedure ○ Cutting patterns • Site use • Topography • Weather conditions • Contract documents • Standards and specifications
7. Describe pest and disease management of turfgrass	• IPM • Biotic pests • Abiotic factors • Jurisdictional regulations • Standards and specifications
8. Describe turfgrass repair	• Seed • Sod

Achievement Criteria

Performance	The learner will create a maintenance plan for grass/turf.
Conditions	The learner will be given the necessary materials, tools and equipment.
Criteria	The learner will score a passing grade of 70% or better on a rating sheet according to the following criteria: • Assessed the site • Identified problems • Created a maintenance plan

Level 2

Landscape Horticulturist

Line (GAC): B USE TOOLS, EQUIPMENT AND VEHICLES

Competency: B1 Use hand tools

Objectives

To be competent in this area, the individual must be able to:

- Use and maintain hand tools.
- Store hand tools.

LEARNING TASKS	CONTENT
1. Select and use hand tools	• See the general list of Tools and Equipment and the tool list that is specific for Level Two, detailed in the Training Provider Standards of this Program Outline • Environmental implications
2. Perform hand tool maintenance (for level appropriate tools)	• Cleaning and disinfecting • Lubricating • Damage • Excessive wear • Proper operation • Sharpening • Replacing components
3. Store hand tools (for level appropriate tools)	• Organization • Safety • Security • Preservation

Line (GAC): B USE TOOLS, EQUIPMENT AND VEHICLES

Competency: B2 Use power tools

Objectives

To be competent in this area, the individual must be able to:

- Use and maintain power tools.
- Store power tools.

LEARNING TASKS	CONTENT
1. Select and use power tools	• See the general list of Tools and Equipment and the tool list that is specific for Level One, detailed in the Training Provider Standards of this Program Outline • Adjusting • Manufacturer's specifications • Environmental implications • Removal from service ○ Company policy • Safety features

2. Perform power tool maintenance (for level appropriate tools)	• Operational maintenance
	  ○ Cleaning and disinfecting
	  ○ Lubricating
	  ○ Fluid levels
	  ○ Tire pressure
	  ○ Adjusting
	  ○ Damage
	  ○ Excessive wear
	  ○ Malfunction
	  ○ Proper operation
	  ○ Sharpening
	  ○ Balancing
	  ○ Replacing components
	  ○ Cooling fins
	  ○ Maintenance schedule
	  ○ Manufacturers' specifications
	  ○ Safety features
	• Preventative maintenance
	  ○ Fuel
	  ○ Filters
	  – Air
	  – Fuel
	  ○ Lubrication
	  – Oil
	  – Grease
	  ○ Spark plug

LEARNING TASKS	CONTENT
	○ Controls and drive mechanisms ○ Bolts, belts, fittings, hoses ○ Tire pressure ○ Batteries
3. Store power tools (for level appropriate tools)	• Organization • Safety • Security • Preservation

Line (GAC): B USE TOOLS, EQUIPMENT AND VEHICLES

Competency: B3 Use measuring equipment

Objectives

To be competent in this area, the individual must be able to:

- Use and maintain measuring equipment.
- Store measuring equipment.

LEARNING TASKS	CONTENT
1. Select and use measuring equipment	• See the general list of Measuring Equipment and the specific list of Measuring Equipment for Level One, detailed in the Training Provider Standards of this Program Outline
2. Perform maintenance on measuring equipment (for level appropriate equipment)	• Cleaning and disinfecting • Proper operation • Contaminants • Calibrating • Batteries • Damage • Excessive wear • Proper operation
3. Store measuring equipment (for level appropriate equipment)	• Organization • Safety • Security • Manufacturer's specifications

Line (GAC): B USE TOOLS, EQUIPMENT AND VEHICLES

Competency: B4 Use vehicles and motorized equipment, trailers and attachments

Objectives

To be competent in this area, the individual must be able to:

- Identify basic vehicle systems and components.
- Describe the procedure to attach a trailer to a vehicle.
- Inspect and consider factors for the selection of vehicles, motorized equipment, attachments and trailers.
- Operate vehicles and motorized equipment.

LEARNING TASKS	CONTENT
1. Identify basic vehicle systems and components	• Drive systems • Brakes • Control/safety systems • Carburetor • Ignition system • Starter components • Piston

2. Consider factors for the selection of vehicles, motorized equipment, attachments and trailers	• Characteristics
	• Applications
	• Operation
	• Equipment types
	  ○ Trucks
	  ○ Turfgrass maintenance equipment
	  ○ Skid steers
	  ○ Utility vehicles
	  ○ Tractors
	  ○ Buckets
	  ○ Aerators
	  ○ Rototiller
	  ○ Trailers
	  – Flatbed
	  – Dump

3. Describe the procedure to attach a trailer to a vehicle	• Jurisdictional regulations • Vehicle/trailer type • Safety

4. Inspect vehicles, motorized equipment, attachments and trailers	• Equipment and attachments
	  ○ Skid steers
	  ○ Vehicle/trailer
	• Defects
	• Damage
	• Wear
	• Safety features

LEARNING TASKS	CONTENT

5. Operate vehicles and motorized equipment	• Equipment and attachments
	  ○ Skid steer
	• Jurisdictional regulations
	  ○ Licencing requirements
	• Manufacturer's specifications
	• Company policy
	• Three point contact
	• Safe equipment operation
	  ○ Starting, speed and slopes
	• Power take-off precautions

Line (GAC): C ORGANIZE WORK

Competency: C1 Perform site assessments

Objectives

To be competent in this area, the individual must be able to:

- Identify and mark public and private utilities.
- Examine soil conditions.
- Examine soil compaction and drainage.
- Perform soil analysis and identify existing plants.

LEARNING TASKS	CONTENT

1. Select and use specific tools and equipment independently	• Tools
	  ○ Soil probe
	  ○ Shovels
	  ○ Rakes

2. Identify markings for public and private utilities	• BC One Call
	  ○ Cable
	  ○ Natural gas
	  ○ Power
	  ○ Telephone

3. Mark locations of private utilities	• Irrigation lines • Drainage systems • Landscape lighting components • Locate septic components if necessary
4. Identify existing plants	• Health • Vigour • Maintenance practices • Indicator plants

5. Assess landscape site soils	• Sampling and testing for quality
	• Collecting samples
	  ○ Nutrient analysis
	  ○ Chemical analysis
	  ○ Textural analysis
	• Samples for soil layering

6. Examine soil compaction and drainage	• Soil layering or horizons • Impact of soil layers on water movement

7. Recognize soil erosion	• Characteristics
	  ○ Gullies
	  ○ Rills
	  ○ Topsoil depth
	  ○ Displaced soil
	  ○ Exposed roots
	• Environmental conditions

LEARNING TASKS	CONTENT
8. Perform soil tests	○ Wind ○ Rain • Percolation • Core sampling • Texture tests

Line (GAC): C ORGANIZE WORK

Competency: C2 Use documentation and reference material

Objectives

To be competent in this area, the individual must be able to:

- Interpret project specifications.
- Read plans.
- Identify relevant legislation and policies.

LEARNING TASKS	CONTENT
1. Interpret symbols and abbreviations to determine the scope of work	• Property lines • Grades • Elevations • Hardscape and softscape elements • Utilities
2. Interpret project specifications	• Planting plan • Softscape and hardscape details • Contract documentation
3. Interpret specified scale	• Site layout • Job planning activities

4. Read plans	• Title block
	• Construction and landscape plans
	  ○ Site plan
	  ○ Layout plan
	  ○ Grading plan
	  ○ Planting plan
	  ○ Lighting plan
	• Detailed drawings
	  ○ Section view
	  ○ Exploded view

5. Identify current government legislation and company policies	• Relevant legislation
	  ○ Federal
	  ○ Municipal
	  ○ Provincial
	• Transportation
	• Water
	• Habitat and wildlife preservation

Line (GAC): C ORGANIZE WORK

Competency: C3 Maintain records

Objectives

To be competent in this area, the individual must be able to:

- Describe examples of additional records.
- Describe the purpose of comparing packing slips with original orders.

LEARNING TASKS	CONTENT
1. Describe examples of additional records	• Vehicle log ○ Mileage • Fertilizer/Lime application rates • Test results • Way bills
2. Describe the purpose of comparing packing slips with original orders	• Quoted pricing • Quantities • Species

Line (GAC): C ORGANIZE WORK

Competency: C6 Organize materials and equipment

Objectives

To be competent in this area, the individual must be able to:

- Describe the purpose of inspection and verification of plants and materials.
- Describe storage area specifications for equipment and hazardous materials.

LEARNING TASKS	CONTENT
1. Describe the purpose of inspection and verification of plants and materials	• Accuracy • Quality • Quantity
2. Describe storage area specifications for equipment and hazardous materials	• Jurisdictional regulations • Company policy • CLS

Line (GAC): C ORGANIZE WORK

Competency: C7 Transport materials

Objectives

To be competent in this area, the individual must be able to:

- Describe the transportation of materials.
- Describe the procedure to perform circle checks.

LEARNING TASKS	CONTENT
1. Describe the transportation of materials	• Weight and height restrictions • Load distribution requirements • Jurisdictional regulations • Company policy
2. Describe the procedure to perform circle checks	• Log book • Vehicle • Towed equipment • Jurisdictional regulations • Company policy

Line (GAC): C ORGANIZE WORK

Competency: C8 Transport equipment

Objectives

To be competent in this area, the individual must be able to:

- Describe considerations in determining route.
- Describe the procedure to perform circle checks.
- Describe the transportation of equipment and attachments.

LEARNING TASKS	CONTENT
1. Describe considerations in determining route	• Heavy hauling • Weight and height restrictions • Road closures • Weather • Efficiency
2. Describe the procedure to perform circle checks	• Log book • Vehicle • Towed equipment • Jurisdictional regulations • Company policy
3. Describe the transportation of equipment and attachments	• Weight and height restrictions • Load distribution requirements • Jurisdictional regulations • Company policy

Line (GAC): F APPLY HORTICULTURAL PRACTICES

Competency: F1 Practice basic plant science

Objectives

To be competent in this area, the individual must be able to:

- Examine the internal anatomy of stems, roots and leaves as they relate to photosynthesis, respiration, and transpiration.

LEARNING TASKS	CONTENT
1. Describe the microscopic anatomy of plants	• Generalized plant cell • Cell division • Cell types, tissues, and their functions
2. Describe plant organ internal anatomy	• Herbaceous and woody stems • Herbaceous and woody roots • Leaves • Monocots versus dicots
3. Describe plant growth	• Primary • Secondary
4. Describe stages in the life cycle of angiosperms and gymnosperms	• Gamete production • Pollination • Double fertlization

5. Describe water movement through a plant	• Diffusion
	• Osmosis
	• Active transport
	• Transpiration
	  ○ Capillary attraction
	  ○ Adhesion and cohesion
	• Environmental effects

6. Describe basic principles of photosynthesis	• Light and dark reactions • Chlorophyll • Translocation • Storage • Respiration • Environmental effects

7. Explain the influence of environmental factors on plant physiology	• Light
	• Water
	• Air quality
	  ○ Pollution
	  ○ Carbon dioxide availability
	• Temperature
	• Nutrient availability

LEARNING TASKS	CONTENT
8. Describe the growth response to external stimuli	• Photoperiod and flower production • Photoperiod • Tropisms and plant growth

9. Describe basic growth responses to plant hormones	• Hormone groups
	  ○ Auxins
	  ○ Gibberellins (GA)
	  ○ Cytokinins
	  ○ Ethylene
	• Abscisic acid (ABA)

Line (GAC): F APPLY HORTICULTURAL PRACTICES

Competency: F2 Identify plants and plant requirements

Objectives

To be competent in this area, the individual must be able to:

- Identify plant and plant requirements for 75 woody and non-woody plants.
- Identify plants used in all segments of horticulture.
- Identify weed and invasive plants.

LEARNING TASKS	CONTENT

1. Recognize a range of plant materials commonly used in horticulture	• Natural habitat
	  ○ Alpine plants
	  ○ Woodland understory plants
	  ○ Mediterranean plants
	  ○ Bog plants
	  ○ Native plants
	• Plant use characteristics
	  ○ Bedding plants
	  ○ Cut flowers
	  ○ Trees and shrubs
	  ○ Groundcovers
	  ○ Climbers
	• Characteristics of individual plants and plant groups
	• Plant size
	• Texture
	• Plant form
	• Provenance

2. Explain plant hardiness zones	• Plant hardiness zones • Relationship between plant health and hardiness zones
3. Identify weeds	• Annual • Biennial • Woody • Perennial
4. Describe the characteristics of weeds	• Invasive • Noxious • Nuisance

5. Recognize and describe bud, bark, foliage, flower, and fruit characteristics	• Bud characteristics such as
	  ○ Morphology
	  ○ Type (vegetative or flower)
	  ○ Arrangement
	• Bark characteristics
	  ○ Furrowed

LEARNING TASKS	CONTENT
	○ Smooth ○ Plate-like • Describing leaves using botanical terminology and distinguishing a range of inflorescence type and fruit to aid in plant identification
6. Identify and describe 75 woody and non-woody plants	• Using botanical terms • According to its cultural and maintenance requirements

Line (GAC): F APPLY HORTICULTURAL PRACTICES

Competency: F3 Manage plant health and growing conditions

Objectives

To be competent in this area, the individual must be able to:

- Describe tests and interpret results.
- Determine factors for plant selection and placement.
- Amend growing conditions.
- Apply fertilizers and amendments.

LEARNING TASKS	CONTENT
1. Collect samples to prepare for testing	• Growing media • Foliar samples • Water samples • On site • Lab
2. Describe types of tests	• Growing media • Foliar samples • Water samples • On site • Lab
3. Interpret test results	• Growing media • Foliar samples • Water samples • On site • Lab
4. Develop a plan for implementing corrective measures	• Fertilizing • Liming • Irrigation • Mulching • Maintenance procedures
5. Determine factors for plant selection and placement	• Plant requirements • Plant health • Plant materials • 'Right plant right place'
6. Amend growing conditions to meet plant requirements	• Microclimate • Available space • Topography • Soil type • Soil fertility • Soil depth • pH level

LEARNING TASKS	CONTENT

7. Measure and apply fertilizer and amendments	• Water availability
	• Lime
	• Equipment calibration
	• Plant life cycle
	• Product labels
	  ○ Grade
	  ○ Analysis
	• Application rate
	• Fertilizer formulations
	  ○ Foliar feed
	  ○ Liquid
	  ○ Granular

Achievement Criteria

Performance	The learner will apply fertilizer/lime.
Conditions	The learner will be given the necessary materials, tools and equipment.
Criteria	The learner will score a passing grade of 70% or better on a rating sheet according to the following criteria: • Safely performed tasks • Calculate product quantity • Calibrate equipment • Apply product uniformly

Line (GAC): F APPLY HORTICULTURAL PRACTICES

Competency: F4 Prune plant materials

Objectives

To be competent in this area, the individual must be able to:

- Demonstrate pruning techniques for shrubs, groundcovers, and vines.
- Use common arboricultural hand tools to prune shrubs, groundcovers, and vines.

LEARNING TASKS	CONTENT

1. Describe shrub, vine and groundcover pruning considerations	• Reasons for pruning shrubs, vines and groundcover
	  ○ Health and vigour
	  ○ Direct, control, or modify growth
	  ○ Enhancing fruit and flower production
	  ○ Dead, disease, damage and interfering (D,D,D,I)
	  ○ Aesthetics
	• Factors affecting the pruning of shrubs vines and groundcover
	  ○ Plant form
	  ○ Function
	  ○ Age
	  ○ Location
	  ○ Timing
	  ○ Pre-pruning treatments
	  ○ Severe pruning
	  ○ Alternatives to pruning
	• Efficiencies while pruning
	  ○ Hand pruning vs. mechanical tools
	  ○ Efficiencies and maintenance standard

2. Select and use tools and equipment	• Secateurs
	• Hand saw
	• Loppers
	• Shears
	  ○ Manual
	  ○ Power
	• Types of ladders
	  ○ Orchard
	  ○ Extension
	  ○ Step
	• Rakes
	• String levels

LEARNING TASKS	CONTENT

3. Demonstrate pruning techniques for young and established shrubs, groundcovers and vines	• Pruning cuts
	• General pruning techniques
	  ○ Cleaning
	  ○ Thinning
	  ○ Raising
	  ○ Reduction
	  ○ Renovation
	  ○ Hedging
	  ○ Removal

4. Describe timing of pruning shrub, vine and groundcover	• Plant groups according to growth and flowering habits
	• Factors that affect pruning time
	  ○ Dormant season
	  ○ Growth response
	  ○ Wind and frost damage
	  ○ Non-dormant pruning
	  ○ Scorch
	  ○ Site activities

5. Demonstrate safe working practices and operation of common pruning equipment and tools	• Safe working practices
	  ○ PPE required
	  ○ Safe working environment
	  ○ Ergonomics
	  ○ Lifting and carrying safety
	  ○ Safely operating power equipment
	  ○ General procedures when operating power equipment
	  ○ Jurisdictional regulations
	• Maintenance of tools
	  ○ Tool cleaning procedures
	  ○ Pruning equipment
	  ○ Ladders

6. Organize and dispose of pruned material	• Jurisdictional regulations • Efficiencies

Line (GAC): G APPLY ENVIRONMENTAL PRACTICES

Competency: G1 Practice environmental stewardship

Objectives

To be competent in this area, the individual must be able to:

- Discuss opportunities for stewardship relating to landscape maintenance and installation.

LEARNING TASKS	CONTENT
1. Identify opportunities for stewardship relating to landscape maintenance and installation	• Tools • Equipment • Plants • Materials • Disposal • Organized work flow • Site protection • Maintenance practices • Installation practices

Line (GAC): G APPLY ENVIRONMENTAL PRACTICES

Competency: G3 Practice soil stewardship

Objectives

To be competent in this area, the individual must be able to:

- Examine soil formation, the physical, chemical and biological properties of soils and soilless media as they relate to use, soil quality, and plant growth.
- Collect soil samples for lab testing.
- Discuss interpretation of lab testing results and amendments to growing media.

LEARNING TASKS	CONTENT

1. Examine the types and functions of soil biota	• Types
	  ○ Bacteria
	  ○ Fungi
	  ○ Protozoa
	  ○ Nemotodes
	  ○ Arthropods
	  ○ Earthworms
	  ○ Plants
	• Role in soil quality
	• Promoting beneficial soil organisms

2. Explain the role of organic matter in soil	• Composition • Chemical and physical behaviour • Carbon cycle

3. Describe composting considerations	• Processes
	  ○ Aerobic vs. anaerobic microorganisms
	  ○ Food web of the compost pile
	• Systems
	• Maintenance
	• Use of finished compost
	• Jurisdictional regulations

4. Describe how soil colloids determine soil chemical properties	• Soil pH and colloidal material • Cations and plant roots

5. Describe mineral nutrients in soil	• Essential nutrients
	  ○ Primary macronutrients
	  ○ Secondary macronutrients
	  ○ Micronutrients
	• Availability
	• Nutrient uptake
	• Nitrogen cycle

6. Describe the effect of pH on soil properties	• Definitions • Measurement

LEARNING TASKS	CONTENT

	• Adjustment
	  ○ Buffering capacity
	• Impacts
	  ○ Plant growth
	  ○ Soil biota
	  ○ Nutrient availability

7. Describe the effect of salinity and sodicity on soil properties	• Definitions
	• Measurement
	• Adjustment
	• Impacts
	  ○ Structure
	  ○ Water uptake
	  ○ Availability of essential nutrients

8. Summarize nutrient management	• Fertilizer formulations
	  ○ Foliar feed
	  ○ Liquid
	  ○ Granular
	• Fertilizer types
	  ○ Slow-release
	  ○ Water soluble
	  ○ Organic
	  ○ Inorganic
	• Amendments
	  ○ Manure
	  ○ Mycorrhizae
	  ○ Compost

9. Discuss site remediation	• Remediation of soil compaction
	• Remediation of drainage and soil infiltration issues
	  ○ Subsurface drainage
	  ○ Mounded plant beds
	  ○ Raised plant beds
	  ○ Subsoil sculpturing

10. Sample soils	• Collection of samples
	  ○ Field and urban settings
	  ○ Soilless media
	• Sending samples to the lab to determine
	  ○ Fertility levels
	  ○ Deficiency levels
	• Interpreting lab results
	• Limitations of soil testing
	• Determining growing media amendments as required

LEARNING TASKS	CONTENT

11. Discuss the importance of preserving soil health	• Reasons
	  ○ Economic
	  ○ Environmental
	  – Erosion
	  – Soil organisms
	  – Pollution
	  – Carbon sequestration
	  – Plant health
	• Considerations
	  ○ Construction practices
	  ○ Fertilizer selection
	  ○ Amendment selection
	  ○ Cultivation

12. Identify the considerations when selecting soil amendments	• Maintaining optimum growing conditions • Minimize environmental impacts

Line (GAC): G APPLY ENVIRONMENTAL PRACTICES

Competency: G4 Practice water stewardship

Objectives

To be competent in this area, the individual must be able to:

- Describe water stewardship.
- Describe procedures for environmental water sampling.

LEARNING TASKS	CONTENT
1. Describe elements of water stewardship	• Protection of endangered species in waterway • Water retention • Water conservation • Pollution prevention • Infiltration promotion • Riparian restoration • Prevention of invasive species spread in waterways • Preservation of tree canopy

2. Describe procedures for environmental water sampling	• Collection
	• Labelling
	• Shipping
	• Interpretation
	  ○ pH
	  ○ Contaminants
	  ○ Nutrient levels

Line (GAC): H PERFORM PRE-CONSTRUCTION ACTIVITIES

Competency: H2 Prepare construction site

Objectives

To be competent in this area, the individual must be able to:

- Plan and prepare the site according to plans and specifications and jurisdictional regulations.

LEARNING TASKS	CONTENT

1. Select and use tools and equipment	• Tools
	  ○ Levels
	  ○ Transits
	  ○ Hammers
	• Equipment
	  ○ Skid steers
	  ○ Loaders
	  ○ Excavators

2. Interpret and extract information	• Plans
	  ○ Grading plans
	  ○ Planting plans
	  ○ Layout plans
	• Site conditions
	• Discrepancies
	• Communication

3. Describe site preparation and protection of existing site elements	• Existing plant material • Existing hard features • CLS
4. Remove unwanted materials	• Hazards • Debris • Invasive species • CLS
5. Create site access	• Effeciency • Security • Site conditions

6. Locate utilities	• Markers
	• Utility hazards
	  ○ Underground
	  ○ Overhead

7. Locate and cordon off areas to minimize environmental impact	• Environmental considerations
	• Plans and specifications
	• Environmental mitigation mechanisms
	  ○ Filters
	  ○ Silt fencing
	  ○ Storm sewer guards

LEARNING TASKS	CONTENT
8. Lay out site	• Marking and staking elements to be installed
9. Establish grade	• Positive drainage • CLS • Rough grade • Finished grade
10. Verify site is prepared and ready for the next phase	• Communication with trades on site

Line (GAC): I INSTALL HARDSCAPE

Competency: I2 Install surface materials

Objectives

To be competent in this area, the individual must be able to:

- Install walkway, patio, driveway and parking lot materials using the correct tools, equipment and materials, as per specifications.

LEARNING TASKS	CONTENT

1. Select and use hand and power tools	• Tools
	  ○ Shovels
	  ○ Picks
	  ○ Chisels
	  ○ Diamond saw
	  ○ Guillotine
	  ○ Wheelbarrows
	  ○ Brooms
	  ○ Power blowers

2. Select and use equipment	• Equipment
	  ○ Excavators
	  ○ Plate compactors
	  ○ Skid steers

3. Describe the properties and use of surface materials	• Surface materials
	  ○ Natural stones
	  ○ Concrete
	  ○ Aggregates
	  ○ Permeable pavement
	  ○ Synthetic materials (artificial turf)
	  ○ Paving stones

4. Prepare for installation	• Layout • Excavation • Subgrade compaction • Storage of excavated materials • Removal of excavated materials • Standards and specifications
5. Install walkway, patio, driveway and parking lot materials	• Sleeving • Geotextiles • Aggregate base ○ Lifts • Grade • Positive drainage • Edge restraints • Bedding materials

LEARNING TASKS	CONTENT
	○ Sand ○ Limestone screening ○ High performance bedding materials ○ Concrete base • Screeding • Dimensions ○ Measure ○ Cut ○ Fit • Surface cleaning • Joint materials ○ Mortars ○ Sand ○ Polymeric sand • Cleaners and sealants • Standards and specifications
6. Clean-up site	• Surfaces • Damage repairs • Waste material disposal

Achievement Criteria

Performance	The learner will construct a small surface area such as a patio or walkway.
Conditions	The learner will be given the necessary materials, tools and equipment.
Criteria	The learner will score a passing grade of 70% or better on a rating sheet according to the following criteria: • Performed tasks safely • Installed according to plans

Line (GAC): I INSTALL HARDSCAPE

Competency: I3 Install steps and retaining walls

Objectives

To be competent in this area, the individual must be able to:

- Install steps and retaining walls using the correct tools, equipment and materials, as per specifications.

LEARNING TASKS	CONTENT

1. Select and use hand and power tools	• Tools
	  ○ Shovels
	  ○ Picks
	  ○ Diamond saw
	  ○ Stone chisels
	  ○ Wheelbarrows
	  ○ Brooms
	  ○ Power blowers
	  ○ Mechanical sweepers

2. Select and use equipment	• Equipment
	  ○ Excavators
	  ○ Plate compacters
	  ○ Skid steers
	  ○ Vibrator plate tampers
	  ○ Hand tampers

3. Perform safe work practices	• PPE • Recognizing work hazards • Moving materials
4. Lay out and mark construction area	• Layout ○ Drawings and specifications • Horizontal and vertical measurements • Treads and risers • Staking
5. Prepare to install steps and retaining walls	• Layout • Excavation • Subgrade compaction • Storage of excavated materials • Removal of excavated materials • Standards and specifications

6. Install steps and retaining walls	• Geotextile materials
	• Aggregate base
	• Bedding materials
	  ○ Sand
	  ○ Limestone screening
	  ○ Concrete footing

LEARNING TASKS	CONTENT
	• Screeding • Procedures • Stacking and assembling courses • Batter • Staggering seams • Geogrid • Drainage systems • Backfill • Adhesives and mortar • Cleaners and sealants • Standards and specifications
7. Cleanup site	• Surfaces • Damage repairs • Waste material disposal

Achievement Criteria

Performance	The learner will construct a small retaining wall (optional: with steps).
Conditions	The learner will be given a plan, tools, equipment and materials.
Criteria	The learner will score a passing grade of 70% or better on a rating sheet according to the following criteria: • Performed tasks safely • Installed retaining wall (with steps), according to plans

Line (GAC): J INSTALL SOFTSCAPE

Competency: J2 Install exterior landscape plants

Objectives

To be competent in this area, the individual must be able to

- Install exterior landscape plants using the correct tools, equipment and materials, as per specifications.

LEARNING TASKS	CONTENT

1. Select and use hand tools	• Tools
	  ○ Tree dollies
	  ○ Shovels
	  ○ Rakes

2. Select and use equipment	• Equipment
	  ○ Tree spade
	  ○ Boom trucks
	  ○ Skid steers and attachments

3. Prepare plant materials	• Stock types
	  ○ Container
	  ○ Ball and burlap
	  ○ Bare root
	  ○ Caliper stock
	• Containers
	• Plant tags
	• Root balls
	• Irrigation

4. Monitor and maintain plant health	• Dessication • Storage

5. Lay out plant materials	• Placement
	• Drawings and specifications
	• Suitablility for conditions
	  ○ Sun and wind exposure
	  ○ Proximity to building
	  ○ Water availability

6. Plant, stake and guy plant materials	• Drawings and specifications
	• Contract documents
	• Industry standards
	  ○ Root flare
	  ○ Depth and width of planting hole
	• Wind exposure

7. Prune plant materials	• Roots • Dead, diseased and damaged • Appearance

LEARNING TASKS	CONTENT
8. Verify moisture content	• Growing media • Irrigation • Plant material
9. Dispose of or recycle excess materials	• Jurisdictional regulations • Industry standard
10. Describe procedures for post-planting care	• Mulching • Protection • Stabilizing • Irrigation

Achievement Criteria

Performance	The learner will install and or transplant exterior landscape plants. (See J3)
Conditions	The learner will be given appropriate materials, tools and equipment.
Criteria	The learner will score a passing grade of 70% or better on a rating sheet according to the following criteria: • Performed all tasks in a safe manner • Selected and used appropriate tools and equipment • Monitored plant health throughout installation process • Dug planting holes • (For transplanting, plant material is excavated as directed) • Moved plant materials to desired location • Laid out plant materials as per plan • Planted, staked and guyed plant materials as specified • Pruned plant materials as required • Verified moisture content of growing media to ensure adequate irrigation • Verified plant installation meets specifications

Line (GAC): J INSTALL SOFTSCAPE

Competency: J3 Transplant plants

Objectives

To be competent in this area, the individual must be able to:

- Perform basic planting and transplanting techniques.
- Use common arboricultural hand tools to prune trees, shrubs, groundcovers, and vines.

LEARNING TASKS	CONTENT
1. Select and use hand tools and equipment	• Shovels • Tree dolly • Tree spades • Axes
2. Describe reasons for transplanting plants	• Growth control • Prevention of root girdling • Relocation • Infrastructure conflicts

3. Verify plant is viable for transplant	• Plant type
	  ○ Woody perennial
	  ○ Herbaceous perennial
	• Health
	• Transpiration rate
	• Plant growth stage
	  ○ Dormancy
	• Weather conditions
	  ○ Humidity
	  ○ Temperature
	  ○ Precipitation
	  ○ Wind

4. Prepare plant for transplantation	• Root pruning • Irrigation • Plant size • Tying branches

5. Dig plant material	• Irrigation
	• Industry standard
	  ○ International Society of Arborists (ISA) caliper guidelines
	  ○ Canadian Nursery Landscape Association (CNLA) Standards for nursery stock
	  ○ Root mass
	• Protection
	  ○ Ball and burlap
	  ○ Boxing

LEARNING TASKS	CONTENT
	○ Bare root
6. Transplant plants	• Timing ○ Dormant vs. non-dormant transplanting • Plant protection during transport • Root ball size • Height relationship to calliper by types • Planting techniques ○ Site drainage characteristics ○ Planting ○ Air pocket prevention ○ Plant staking ○ Methods of staking ○ One vs. two stakes ○ Guyed staking ○ Duration ○ Materials
7. Install plant material	• Depth and width of planting hole • Stabilization • Irrigation • Site drainage characteristics • Backfill ○ Growing media ○ Air-pocket prevention
8. Prune plant material	• Roots • Dead, diseased and damaged • Appearance
9. Verify moisture content	• Growing media • Irrigation • Plant material ○ Transplant shock ○ Flagging
10. Dispose of or recycle excess materials	• Jurisdictional regulations • Industry standard
11. Describe procedures for post-transplanting care	• Mulching • Protection • Stabilizing • Irrigation

Achievement Criteria

Performance	The learner will install and or transplant exterior landscape plants. (See J2)
Conditions	The learner will be given the necessary materials, tools and equipment.
Criteria	The learner will score a passing grade of 70% or better on a rating sheet according to the following criteria:

- Performed all tasks in a safe manner
- Selected and used appropriate tools and equipment
- Monitored plant health throughout installation process
- Dug planting holes
- (For transplanting, plant material is excavated as directed)
- Moved plant materials to desired location
- Laid out plant materials as per plan
- Planted, staked and guyed plant materials as specified
- Pruned plant materials as required
- Verified moisture content of growing media to ensure adequate irrigation
- Verified plant installation meets specifications

Line (GAC): J INSTALL SOFTSCAPE

Competency: J4 Install mulch

Objectives

To be competent in this area, the individual must be able to:

- Install mulch using the correct tools, equipment and materials, as per specifications.

LEARNING TASKS	CONTENT

1. Select and use hand tools	• Tools
	  ○ Wheelbarrows
	  ○ Landscape rakes
	  ○ Pitchforks
	  ○ Shovels

2. Select and use equipment	• Equipment
	  ○ Skid steers
	  ○ Blower trucks
	  ○ Loaders

3. Describe properties and purpose of mulch	• Types
	  ○ Wood
	  ○ Bark
	  ○ Aggregates
	  ○ Composts
	• Purposes
	  ○ Weed supression
	  ○ Water retention
	  ○ Soil amending
	  ○ Erosion prevention
	  ○ Compaction prevention
	  ○ Temperature regulation
	• Storage
	• Fire prevention
	• Standards and specifications
	• Jurisdictional regulations

4. Prepare the area to be mulched	• Standards and specifications • Contracts • Grades • Soil compaction • Landscape fabric

5. Apply mulch	• Depth
	• Timing
	  ○ Soil temperature
	  ○ Soil moisture
	• Distribution
	• Proximity

LEARNING TASKS	CONTENT
6. Verify mulch installation	○ Plant material ○ Structures • Plant health • Standards and specifications • Contract documents

Achievement Criteria

Performance	The learner will install mulch.
Conditions	The learner will be given the appropriate materials, tools and equipment.
Criteria	The learner will score a passing grade of 70% or better on a rating sheet according to the following criteria: • Performed all tasks in a safe manner • Selected and used appropriate tools and equipment • Verified area to be mulched was prepared according to specifications • Verified mulch materials meet specifications • Applied mulch according to specifications

Line (GAC): L MAINTAIN HARDSCAPE

Competency: L1 Maintain drainage systems

Objectives

To be competent in this area, the individual must be able to:

- Describe maintenance requirements for drainage systems.

LEARNING TASKS	CONTENT
1. Describe maintenance requirements of drainage systems	• Surface • Sub-surface
2. Describe indicators of failure	• Ponding • Blowouts • Washouts • Erosion at drain outlet • Sediment blockage • Root blockage • Iron oxide blockage
3. Describe drainage components	• Drains • Catch basins • Retention ponds
4. Describe optimal flow	• Filters • Screens • Debris removal • Flushing • Grades • Standards and specifications
5. Describe securing of drain covers	• Jurisdictional regulations
6. Describe winterizing of drainage systems	• Heating cables • Hydroflush

Line (GAC): L MAINTAIN HARDSCAPE

Competency: L3 Maintain surface materials

Objectives

To be competent in this area, the individual must be able to:

- Describe maintenance requirements for walkways, patios, driveways and parking lots.

LEARNING TASKS	CONTENT
1. Describe surface defects and hazards	• Peeling paint • Rotting wood • Heaving and settling • Debris • Undesireable growth

2. Describe maintenance procedures for surfaces	• Debris removal
	• Undesireable growth removal
	• Jointing sand top up
	• Blow
	• Sealants
	• Paint
	• Stain
	• Clean
	  ○ Pressure washer
	  ○ Broom
	• Specifications and standards

Line (GAC): L MAINTAIN HARDSCAPE

Competency: L4 Maintain steps and retaining walls

Objectives

To be competent in this area the individual must be able to:

- Describe maintenance requirements for steps and retaining walls.

LEARNING TASKS	CONTENT
1. Describe defects and hazards for steps and retaining walls	• Capstones • Treads • Debris • Undesireable growth • Drainage system ○ Scuppers

2. Describe maintenance procedures for steps and retaining walls	• Debris removal
	• Undesireable growth removal
	• Jointing sand top up
	• Blow
	• Sealants
	• Adhesives
	• Paint
	• Stain
	• Clean
	  ○ Pressure washer
	  ○ Broom
	• Specifications and standards

Line (GAC): M MAINTAIN SOFTSCAPE

Competency: M1 Maintain exterior softscape

Objectives

To be competent in this area, the individual must be able to:

- Describe seasonal planting and protection practices.
- Describe fertilization of plants.
- Describe mulching of beds and containers.

LEARNING TASKS	CONTENT
1. Select and use tools and equipment	• Hand tools • Hand pruners • Spreaders • Scales • Gators • Wheelbarrows • Tarps
2. Describe seasonal planting and removal of plants	• Annuals • Biennials • Perennials • Bulbs • Weeds • Planting plans • Contract documents

3. Describe seasonal protection practices	• Anti-dessicants
	• Burlap wrapping
	• Binding with twine
	• Flax straw
	• Standards and specifications
	• Weather
	  ○ Snow
	  ○ Frost
	  ○ Heat
	  ○ Sun
	  ○ Wind
	  ○ Ice
	• Structures
	  ○ Overwintering
	• Ground cover
	  ○ Fabric
	  ○ Mulch

4. Describe removing staking and guying materials	• Standards and specifications • Plant stabilization

LEARNING TASKS	CONTENT

5. Describe fertilization of plants	• According to soil test recommendations
	• Application rates
	• Calibration
	• N-P-K
	• Environmental considerations
	• Methods
	  ○ Manual
	  ○ Automated
	• Jurisdictional regulations

6. Describe mulching of beds and containers	• Types
	  ○ Organic
	  ○ Inorganic
	• Depth
	• Appearance
	• Re-distribution
	• Plant protection
	• Standards and regulations

Line (GAC): M MAINTAIN SOFTSCAPE

Competency: M4 Propagate plant materials

Objectives

To be competent in this area, the individual must be able to:

- Describe the harvesting and dividing of storage organs.
- Describe propagation methods.

LEARNING TASKS	CONTENT

1. Select and use hand tools and materials	• Tools
	  ○ Digging forks
	  ○ Shovels
	  ○ Spades
	  ○ Saws
	  ○ Knives
	  ○ Hand pruners
	• Materials
	  ○ Rooting hormones
	  ○ Growing media
	  ○ Grafting tape

2. Identify considerations used when selecting stock/parent plants	• Vigour • Health • True to type • Age • Timing • Propagation methods
3. Describe the harvesting and dividing of storage organs	• Rhizomes • Tubers • Bulbs • Corms • Crowns • Roots
4. Describe propagation methods	• Layering • Dividing • Cutting • Seeding • Grafting

Level 3

Landscape Horticulturist

Line (GAC): B USE TOOLS, EQUIPMENT AND VEHICLES

Competency: B1 Use hand tools

Objectives

To be competent in this area, the individual must be able to:

- Use and maintain hand tools.
- Store hand tools.

LEARNING TASKS	CONTENT
1. Select and use hand tools	• See the general list of Tools and Equipment and the tool list that is specific for Level Three, detailed in the Training Provider Standards of this Program Outline • Environmental implications
2. Perform hand tool maintenance (for level appropriate tools)	• Cleaning and disinfecting • Lubricating • Damage • Excessive wear • Proper operation • Sharpening • Replacing components
3. Store hand tools (for level appropriate tools)	• Organization • Safety • Security • Preservation

Line (GAC): B USE TOOLS, EQUIPMENT AND VEHICLES

Competency: B2 Use power tools

Objectives

To be competent in this area, the individual must be able to:

- Use and maintain power tools.
- Store power tools.

LEARNING TASKS	CONTENT
1. Select and use power tools	• See the general list of Tools and Equipment and the tool list that is specific for Level One, detailed in the Training Provider Standards of this Program Outline • Adjusting • Manufacturer's specifications • Environmental implications • Removal from service • Company policy • Safety features

2. Perform power tool maintenance (for level appropriate tools)	• Operational maintenance
	  ○ Cleaning and disinfecting
	  ○ Lubricating
	  ○ Fluid levels
	  ○ Tire pressure
	  ○ Adjusting
	  ○ Damage
	  ○ Excessive wear
	  ○ Malfunction
	  ○ Proper operation
	  ○ Sharpening
	  ○ Balancing
	  ○ Replacing components
	  ○ Cooling fins
	  ○ Maintenance schedule
	  ○ Manufacturers' specifications
	  ○ Safety features
	• Preventative maintenance
	  ○ Fuel
	  ○ Filters
	  – Air
	  – Fuel
	  ○ Lubrication
	  – Oil
	  – Grease
	  ○ Spark plug

LEARNING TASKS	CONTENT
	○ Controls and drive mechanisms ○ Bolts, belts, fittings, hoses ○ Tire pressure ○ Batteries
3. Store power tools (for level appropriate tools)	• Organization • Safety • Security • Preservation

Line (GAC): B USE TOOLS, EQUIPMENT AND VEHICLES

Competency: B3 Use measuring equipment

Objectives

To be competent in this area, the individual must be able to:

- Use and maintain measuring equipment.
- Store measuring equipment.

LEARNING TASKS	CONTENT
1. Select and use measuring equipment	• See the general list of Measuring Equipment and the specific list of Measuring Equipment for Level One, detailed in the Training Provider Standards of this Program Outline
2. Perform maintenance on measuring equipment (for level appropriate equipment)	• Cleaning and disinfecting • Proper operation • Contaminants • Calibrating • Batteries • Damage • Excessive wear • Proper operation
3. Store measuring equipment (for level appropriate equipment)	• Organization • Safety • Security • Manufacturer's specifications

Line (GAC): B USE TOOLS, EQUIPMENT AND VEHICLES

Competency: B4 Use vehicles and motorized equipment, trailers and attachments

Objectives

To be competent in this area, the individual must be able to:

- Describe the environmental considerations of selecting and using vehicles, motorized equipment, attachments and trailers.
- Describe the maintenance of equipment attachments.

LEARNING TASKS	CONTENT
1. Describe the environmental considerations of selecting and using vehicles, motorized equipment, attachments and trailers	• Fuel type • Lubricants • Longevity • Emissions • Noise • Site conditions • Site type • Idling • Jurisdictional regulations
2. Describe the maintenance of equipment attachments	• Grease fittings • Lock-out and tag-out • Hydraulic fluids • Cleaning and disinfecting • Damage and wear • Safety features

Line (GAC): C ORGANIZE WORK

Competency: C1 Perform site assessments

Objectives

To be competent in this area, the individual must be able to:

- Interpret documentation pertaining to site assessment.
- Assess site conditions for protection.
- Identify existing and proposed grading and drainage patterns.

LEARNING TASKS	CONTENT
1. Interpret documentation pertaining to site assessment	• Grading plan • Detailed drawings
2. Assess existing site conditions for protection	• Soil • Structures • Plants
3. Assess landscape site soils	• Construction impact • Change in site conditions
4. Identify growing media conditions and properties	• Contamination • Viability • Tilth
5. Identify existing and proposed grading and drainage patterns	• Grading plan • Topography

Line (GAC): C ORGANIZE WORK

Competency: C2 Use documentation and reference material

Objectives

To be competent in this area, the individual must be able to:

- Apply relevant legislation and policies.
- Use reference materials.

LEARNING TASKS	CONTENT
1. Apply current government legislation and company policies	• Transportation • Water • Habitat and wildlife preservation • Pest control

2. Use catalogues	• Plant identification
	• Comparing products among suppliers
	• Ordering
	  ○ Tools
	  ○ Equipment
	• Plant materials

3. Use text and field books for referencing	• Identifying
	  ○ Pests
	  ○ Diseases
	  ○ Methods of control

Line (GAC): C ORGANIZE WORK

Competency: C3 Maintain records

Objectives

To be competent in this area, the individual must be able to:

- Describe examples of additional records.
- Describe types of shipping and receiving information.

LEARNING TASKS	CONTENT
1. Describe examples of additional records	• Temperatures • Client communications
2. Describe types of shipping and receiving information	• Inventory adjustments • Regulatory documentation • Phytosanitary Certificates

Line (GAC): C ORGANIZE WORK

Competency: C4 Participate in job planning activities

Objectives

To be competent in this area, the individual must be able to:

- Identify and prioritize tasks.
- Verify practices adhere to industry standards.

LEARNING TASKS	CONTENT
1. Identify and prioritize tasks	• Time management • Performance efficiency
2. Consider safety requirements	• Safety plan • Site conditions • Contract documents • Jurisdictional regulations
3. Locate utilities	• Private • Public • Site plan
4. Verify materials	• Plans and specifications • Schedule
5. Verify practices adhere to industry standards	• Safe-work • Horticultural • Construction
6. Identify and schedule clean-up	• Daily • End of contract

Line (GAC): C ORGANIZE WORK

Competency: C5 Order materials

Objectives

To be competent in this area the individual must be able to:

- Describe the considerations for ordering materials.
- Describe the process for keeping records.

LEARNING TASKS	CONTENT
1. Identify required materials	• Types • Size • Quality • Quantity • CLS • Jurisdictional requirements • Contract documents

2. Describe the considerations when ordering materials	• Accuracy of ordering
	  ○ Botanical nomenclature
	  ○ Industry terminology
	• Budget
	  ○ Price comparisons
	• Delivery and pick up schedules
	  ○ Site staging
	  ○ Sequence of tasks
	  ○ Coordination with on site contractors
	• Size and weight

3. Describe the process for keeping records	• Order number • Tracking number • Supplier contact information
4. Identify required documents to prevent delays	• Movement certificates • Permits • Plans • Specifications • Jurisdictional regulations • Purchase orders

Line (GAC): C ORGANIZE WORK

Competency: C6 Organize materials and equipment

Objectives

To be competent in this area, the individual must be able to:

- Receive plants and materials.
- Handle substandard plants and materials.

LEARNING TASKS	CONTENT

1. Receive plants and materials	• Unloading
	• Recording
	• Protection
	• Storage
	  ○ Size and species groupings
	  ○ Designated areas
	  – Product quality
	  – Contamination
	• CLS

2. Handle substandard plants and materials	• Quarantine • Rejection • Disposal • CLS • Jurisdictional regulations • Company policy • Site specifications

Achievement Criteria

Performance	The learner will organize plant materials and equipment onsite.
Conditions	The learner will be given the necessary materials, tools and equipment.
Criteria	The learner will score a passing grade of 70% or better on a rating sheet according to the following criteria: • Confirmed order • Performed final check • Properly handled plants and materials when unloading • Organized and stored materials according to size, type and requirements • Reported and processed substandard materials

Line (GAC): D PARTICIPATE IN MARKETING AND SALES

Competency: D1 Control Inventory

Objectives

To be competent in this area, the individual must be able to:

- Describe the considerations for controlling inventory as per company policies and procedures.

LEARNING TASKS	CONTENT
1. Describe the process for identifying and counting inventory	• Manual • Electronic systems • Inventory records • Company policy
2. Describe the process for sorting and managing inventory	• Type • Age • Quality • Size • Efficiency • Cost effectiveness • Safe disposal • Jurisdictional regulations
3. Describe the considerations for restocking orders	• Quantities • Expiration dates • Seasonal needs • Availability

Line (GAC): D PARTICIPATE IN MARKETING AND SALES

Competency: D2 Sell products and services

Objectives

To be competent in this area the individual must be able to:

- Describe selling products and services.

LEARNING TASKS	CONTENT

1. Describe considerations for client education and advising	• Client needs
	• Plants
	• Products
	• Seasonal purchases
	• Environmental stewardship
	• Services
	• Jurisdictional regulations
	• Up-selling
	  ○ Additional products
	  ○ Special offers

2. Describe merchandizing and marketing of products and services	• Visual display
	  ○ Attractiveness
	  ○ Visibility
	  ○ Professional image
	• Digital advertising
	  ○ Social media
	  ○ On-line presence
	• Print media
	  ○ Brochures
	  ○ Business cards

3. Describe considerations for handling payments for products and services	• Company policy
	• Contracts
	  ○ Scope of work
	  ○ Materials
	  ○ Timelines
	  ○ Costs
	• Invoices
	  ○ Calculating taxes
	• Receipts

Line (GAC): D PARTICIPATE IN MARKETING AND SALES

Competency: D3 Maintain customer relations

Objectives

To be competent in this area, the individual must be able to:

- Describe methods of maintaining good customer relations.

LEARNING TASKS	CONTENT

1. Describe methods of maintaining customer relations	• Addressing concerns
	  ○ Tact
	  ○ Politeness
	  ○ Timing
	• Professional image
	  ○ Dress
	  ○ Equipment
	  ○ Social media
	  ○ Behaviour
	• Public relations
	  ○ On site
	  ○ In transit
	• After-service follow-up
	  ○ Customer satisfaction

2. Describe methods of maintaining customer records	• Names • Title • Address • Phone number • Email • Product preferences • Current records • Accurate records • Company policy • Jurisdictional regulations
3. Identify stakeholders for future inquiries	• Property owners • Designers • Engineers

Line (GAC): F APPLY HORTICULTURAL PRACTICES

Competency: F2 Identify plants and plant requirements

Objectives

To be competent in this area, the individual must be able to:

- Identify plant and plant requirements for 90 woody and non-woody plants.
- Recognize plants suitable for common tropical, floral and interior landscape situations.
- Identify plants suitable for planting in difficult situations.

LEARNING TASKS	CONTENT
1. Recognize plants suitable for common tropical, floral and interior landscape situations	• Interior landscaping • House plants • Floral uses such as cut flowers

2. Recognize plants suitable for planting in difficult situations	• Difficult planting conditions
	  ○ Sunny arid conditions
	  ○ Shade
	  ○ Dry shade
	  ○ Dry soil conditions
	  ○ Wetlands
	  ○ Compacted soils
	  ○ Slopes

3. Identify and describe 90 woody and non-woody plants	• Using botanical terms • According to its cultural and maintenance requirements

Line (GAC): F APPLY HORTICULTURAL PRACTICES

Competency: F4 Prune plant materials

Objectives

To be competent in this area, the individual must be able to:

- Demonstrate pruning techniques for trees.
- Use common arboricultural hand tools to prune trees.

LEARNING TASKS	CONTENT
1. Select and use tools and equipment	• Pole saw • Pole prunner • Hand saw

2. Describe tree pruning considerations	• Reasons for pruning trees
	  ○ Health and vigour
	  ○ Direct, control, or modify growth
	  ○ Enhancing fruit and flower production
	  ○ Dead, disease, damage and interfering (D,D,D,I)
	  ○ Aesthetics
	• Factors affecting the pruning of trees
	  ○ Plant form
	  ○ Function
	  ○ Age
	  ○ Location
	  ○ Timing
	  ○ Pre-pruning treatments
	  ○ Severe pruning
	  ○ Alternatives to pruning
	• Efficiencies while pruning
	  ○ Hand pruning vs. mechanical tools
	  ○ Efficiencies and maintenance standard

3. Recognize factors contributing to tree failure	• Structural defects • Plant species • Size • Age • Site conditions • Past maintenance practices • Risks associated with trees

4. Describe basic plant morphology, anatomy, and physiology with regard to pruning trees	• Plant morphology
	  ○ Roots
	  ○ Trunk
	  ○ Crown

LEARNING TASKS	CONTENT
	○ Branching
5. Perform pruning techniques for young and established trees	• Pruning cuts • General pruning techniques ○ Crown cleaning ○ Canopy thinning ○ Canopy raising ○ Canopy reduction ○ Removal ○ Crown balancing ○ Canopy restoration ○ Pinching ○ Pollarding ○ Espalier
6. Describe training techniques for young trees	• Developing trunk calliper • Scaffold spacing • Co-dominant stems • Root pruning and training
7. Describe timing of pruning trees	• Factors ○ Dormant season ○ Growth response ○ Wind and frost damage ○ Non-dormant pruning ○ Scorch ○ Site activities
8. Describe compartmentalization	• Compartmentalization of decay in trees (CODIT): Resisting decay in trees • Callus and wound wood

Achievement Criteria

Performance	The learner will demonstrate tree pruning techniques.
Conditions	The learner will be given the necessary materials, tools and equipment.
Criteria	The learner will score a passing grade of 70% or better on a rating sheet according to the following criteria: • Safely performed tasks • Pruned trees according to industry standards

Line (GAC): F APPLY HORTICULTURAL PRACTICES

Competency: F5 Manage pests, diseases and invasive species

Objectives

To be competent in this area, the individual must be able to:

- Describe conditions that cause plant stress.
- Examine characteristics of pests, diseases and invasive species.
- Apply treatment methods for pests.

LEARNING TASKS	CONTENT
1. Select and use tools and equipment	• Traps • Hand lens • Microscope • Nets • Application equipment • Weed control equipment • Secateurs

2. Describe conditions that contribute to plant stress	• Abiotic factors
	  ○ Light
	  ○ Temperature
	  ○ Humidity
	  ○ Air quality
	  ○ Water supply
	  ○ Mechanical damage
	  ○ Nutrition
	  ○ pH
	• Biotic factors
	  ○ Insects
	  ○ Weeds
	  ○ Pathogens
	  ○ Vertebrates
	  ○ Molluscs
	• Susceptibility to abiotic and biotic stress factors

3. Describe basic arthropod biology	• Morphology • Life cycles • Taxonomy • Eight orders of insects

4. Describe basic pathogen biology	• Morphology and life cycles
	  ○ Fungi
	  ○ Bacteria
	  ○ Viruses
	  ○ Nematodes

LEARNING TASKS	CONTENT

5. Describe the characteristics of weeds	• Defining weeds
	• Common characteristics
	  ○ Prolific seeding
	  ○ Rapid growth
	  ○ Vegetative propagation
	• Impacts of weeds
	  ○ Competition
	  ○ Human and animal health
	  ○ Structural damage
	  ○ Economic
	• Classification of weeds by life cycle
	  ○ Annuals
	  ○ Biennials
	  ○ Herbaceous perennials
	  ○ Woody perennials

6. Describe established methods for controlling pests (IPM)	• Integrated Pest Management (IPM)
	• Six steps of IPM
	  ○ Prevention
	  ○ Identification
	  ○ Monitoring
	  ○ Thresholds
	  ○ Maintenance levels and classes
	  ○ Treatments
	  ○ Evaluation
	• Documentation
	  ○ Jurisdictional regulations
	• Establishing methods for controlling pests
	  ○ Cultural
	  ○ Biological
	  ○ Chemical

7. Describe the damage and management of vertebrate pests	• Wildlife management
	• Vertebrate plant-feeding pests
	  ○ Birds
	  ○ Deer
	  ○ Rodents
	  ○ Moles
	  ○ Racoons

8. Describe the characteristics of invertebrate pests	• Ecology • Pest success • Signs of damage • Common pests ○ Aphids

LEARNING TASKS	CONTENT
	○ Leafhoppers ○ Scales ○ Weevils and beetles ○ Caterpillars and moths ○ Lacebugs ○ Sawflies ○ Thrips ○ Mites ○ Fungus gnats ○ Leaf miners ○ Slugs and snails
9. Describe the characteristics of pathogens	• Pest success • Disease triangle • Disease development cycle • Common categories • Bacterial ○ Galls ○ Blights ○ Canker • Fungal ○ Rots ○ Molds ○ Mildews ○ Rusts ○ Wilts • Nematode ○ Foliar ○ Root ○ Viral ○ Mosaic
10. Describe the integrated strategies for pest control	• Viruses • Bacteria • Invertebrates • Fungi • Nemotodes • Weeds
11. Identify the factors for selecting and applying treatment methods	• Pest identification and life cycle stage • Site conditions ○ Proximity to sensitive areas ○ Weather ○ Site use ○ Topography • Availability

LEARNING TASKS	CONTENT
	○ Product ○ Resources • Perishability • Jurisdictional regulations • Contracts documents
12. Apply treatment methods	• Cultural • Biological • Chemical
13. Describe safe disposal of products and materials	• Pest and disease ridden plant material • Invasive species • Products and containers • Jurisdictional regulations

Line (GAC): G APPLY ENVIRONMENTAL PRACTICES

Competency: G1 Practice environmental stewardship

Objectives

To be competent in this area, the individual must be able to:

- Discuss opportunities for stewardship related to pest and disease management.

LEARNING TASKS	CONTENT
1. Identify opportunities for stewardship related to pest and disease management	• Tools • Equipment • Plants • Materials • Disposal • Organized work flow • Site protection • Maintenance practices • Installation practices

Line (GAC): G APPLY ENVIRONMENTAL PRACTICES

Competency: G4 Practice water stewardship

Objectives

To be competent in this area, the individual must be able to:

- Describe practices that promote water stewardship.
- Describe irrigation system auditing and scheduling procedures .

LEARNING TASKS	CONTENT

1. Describe practices that promote water stewardship	• Low impact development (LID)
	  ○ Rain barrels
	  ○ Infiltration trenches
	  ○ Bioswales
	  ○ Bioretention cells
	  ○ Rain gardens
	  ○ Green roofs
	• Efficient irrigation systems
	• Erosion prevention
	• Responsible chemical use
	• Jurisdictional regulations
	• Waterwise principles
	  ○ Xeriscaping

2. Describe irrigation system auditing and scheduling procedures	• Scheduling
	  ○ Irrigation Industry Association of BC worksheets
	  ○ Controller programs
	  ○ Effects on plant health
	  ○ Jurisdictional regulations
	• Auditing
	  ○ Benefits of irrigation system efficiency
	  ○ Lower quarter distribution uniformity
	  ○ Scheduling coefficient
	  ○ Basic auditing kit requirements
	  ○ Procedures to determine sprinkler head pressure on site
	  ○ Practical auditing procedures including head spacing and levelling

Line (GAC): I INSTALL HARDSCAPE

Competency: I1 Install landscape structures

Objectives

To be competent in this area, the individual must be able to:

- Construct landscape structures using the correct tools, equipment and materials, as per specifications.

LEARNING TASKS	CONTENT

1. Select and use hand and power tools	• Tools
	  ○ Power saws
	  ○ Power drills
	  ○ Hammers
	  ○ Brooms
	  ○ Water and power blowers

2. Select and use equipment	• Equipment
	  ○ Excavators
	  ○ Skid steers and attachments

3. Identify products and materials used in feature construction	• Wood • Lumber grades • Composite • Stone • Segmented block • Concrete
4. Prepare for the installation of landscape structures	• Layout • Area excavation • Foundation preparation • Specifications and drawings

5. Construct landscape structures	• Structures
	  ○ Decks
	  ○ Pergolas
	  ○ Gazebos
	  ○ Fences
	  ○ Outdoor kitchens
	• Installation verification
	• Jurisdictional regulations

6. Describe protective products	• Preservatives • Stains • Sealants
7. Clean up site	• Surfaces • Damage repairs • Waste material disposal

Line (GAC): I INSTALL HARDSCAPE

Competency: I4 Install irrigation systems

Objectives

To be competent in this area, the individual must be able to:

- Install irrigation systems using the correct tools, equipment and materials, as per specifications.

LEARNING TASKS	CONTENT

1. Select and use hand and power tools	• Tools
	  ○ Pipe cutters
	  ○ Crimping tools
	  ○ Trenching shovels
	  ○ Wheelbarrows

2. Select and use equipment	• Equipment
	  ○ Excavators
	  ○ Trenchers
	  ○ Skid steers and attachments

3. Apply irrigation terminology	• Gallons per minute (GPM) • Matched precipitation • Balance precipitation • Static pressure • Dynamic pressure • Feet of head • Pounds per square inch (PSI) • Evapotranspiration (ET) • Head to head spacing

LEARNING TASKS	CONTENT

4. Examine factors that affect irrigation design	• Soil related terminology
	  ○ Soil texture
	  ○ Saturation point
	  ○ Field capacity
	  ○ Wilting point
	  ○ Available water storage capacity (AWSC)
	  ○ Infiltration rate
	  ○ Slope
	  ○ Soil-water budget
	• Soil moisture content
	  ○ Observation of soil and plants
	  ○ Tensiometers
	  ○ Electrical resistance measurements
	  ○ Satellite imaging
	• Landscape and Environmental requirements
	  ○ Effective crop rooting depth
	  ○ Availability coeffecient
	  ○ Maximum soil water deficit
	  ○ Evapotranspiration rate
	  ○ Reference evapotranspiration rate
	  ○ Crop coefficient
	• Irrigation intervals
	• Basic water hydraulics
	• Main pressure
	  ○ Pipe friction loss
	  ○ Design flow rate
	  ○ Pipe size
	  ○ Water velocity
	  ○ Surge pressure concerns
	• Design considerations
	  ○ Sun and shade problems
	  ○ Head selection
	  ○ Precipitation rate
	  ○ Hydro-zones
	  ○ Jurisdictional regulations
	• Water meters

5. Identify irrigation systems	• Manual • Automatic • Drip • Overhead spray • Sprinkler

LEARNING TASKS	CONTENT

6. Identify irrigation components	• Sprinkler heads
	• Valves
	  ○ Pressure regulator valves
	  ○ Solenoid
	• Backflow preventers
	• Controllers
	• Piping and pipe fittings
	  ○ Pipe scheduling
	• Water meters
	• Micro-irrigation systems

7. Prepare for installation	• Layout • Excavation • Subgrade compaction • Storage of excavated materials • Removal of excavated materials • Standards and specifications
8. Install irrigation systems	• Trenching vs. pulling pipe • Bedding pipe and wiring • Backfilling • Head and nozzle heights • Control system
9. Program the control system	• Time • Dates • Duration • Frequency • Jurisdictional regulations
10. Verify installation and operation	• Specifications and standards • Site conditions • Plant health
11. Clean up site	• Damage repairs • Waste material disposal

Achievement Criteria

Performance	The learner will install a small irrigation system.
Conditions	The learner will be given the necessary materials, tools and equipment.
Criteria	The learner will score a passing grade of 70% or better on a rating sheet according to the following criteria: • Performed tasks safely • Installed irrigation system according to plans and specifications • Pressure tested the system • Adjusted sprinkler heads • Programmed the timer correctly

Line (GAC): I INSTALL HARDSCAPE

Competency: I5 Install water features

Objectives

To be competent in this area, the individual must be able to:

- Describe installation water features using the correct tools, equipment and materials, as per specifications.

LEARNING TASKS	CONTENT
1. Describe types of water features	• Ponds • Waterfalls • Gurglers • Fountains

2. Select and use hand and power tools	• Tools
	  ○ Shovels
	  ○ Picks
	  ○ Chisels
	  ○ Wheelbarrows

3. Select and use equipment	• Equipment
	  ○ Excavators
	  ○ Loaders
	  ○ Skid steers

4. Describe site preparation to install water features	• Layout • Excavation as required
5. Describe procedures to install water features	• Geotextiles • Drains • Water supply components • Filtration systems • Pumps • Electrical conduits • Lighting • Liners and membranes • Adhesives, foams and mortar • Aggregates and decorative features
6. Explain maintaining water levels	• Volume • Settling • Optimal performance • Sound • Asthetics
7. Describe the factors for finalizing installation	• Clarity of components • Clarity of water • Ecosystem enhancement products as required

LEARNING TASKS	CONTENT
	○ Beneficial bacteria ○ pH amendments • Plant material • Fish • Installation verification • Specifications and standards
8. Describe site clean up	• Damage repairs • Waste material disposal

Line (GAC): I INSTALL HARDSCAPE

Competency: I6 Install low voltage landscape lighting

Objectives

To be competent in this area, the individual must be able to:

- Describe installation of low voltage landscape lighting using the correct tools, equipment and materials, as per specifications.

LEARNING TASKS	CONTENT

1. Select and use hand and power tools	• Tools
	  ○ Wire strippers
	  ○ Volt meter
	  ○ Ladders
	  ○ Shovels

2. Select and use equipment	• Trenchers • Vibratory plow

3. Describe preparation for installation of low voltage landscape lighting	• Trenches
	• Tunnels
	• Excavated materials
	  ○ Storage
	  ○ Removal
	• Voltage drop calcultation

4. Describe components of low voltage landscape lighting	• Conduit • Wire • Lighting components ○ LED lights • Controller • Fixtures
5. Describe installation of low voltage landscape lighting	• Layout • Assembly • Fixture positioning • Operation and voltage verification
6. Describe lighting adjustments	• Program controller • Lighting fixtures • Customer requirements • Designer effects
7. Describe site cleanup	• Damage repairs • Waste material disposal

Line (GAC): J INSTALL SOFTSCAPE

Competency: J7 Install interior landscape plants

Objectives

To be competent in this area, the individual must be able to:

- Describe installation requirements for interior landscape plants.

LEARNING TASKS	CONTENT

1. Select hand tools	• Tools
	  ○ Tree dollies
	  ○ Shovels
	  ○ Rakes

2. Select equipment	• Equipment
	  ○ Skid steers
	  ○ Tree gantries

3. Prepare plant materials	• Stock types
	  ○ Container
	  ○ Ball and burlap
	  ○ Bare root
	  ○ Caliper stock
	• Containers
	• Plant tags
	• Foliar washing
	• Scarifying root ball
	• Plant health
	  ○ Irrigation
	  ○ Exposure

4. Protect interior furnishings and surfaces	• Floors, walls, ceilings • Furniture and structures • Contract documents • Standards and specifications

5. Prepare planting areas	• Growing media
	  ○ Amendments
	  ○ Fertilizer types
	  ○ Quality
	  ○ Level
	  ○ Quantity
	• Containers
	  ○ Coating
	  ○ Condition
	• Irrigation and drainage
	• Undesireable material removal

6. Stage plant material	• Security

LEARNING TASKS	CONTENT
	• Access • Storage • Time constraints • Contract documents

7. Lay out plant materials	• Placement
	• Drawings and specifications
	• Suitablility for conditions
	  ○ Temperature
	  ○ Lighting
	  ○ Proximity to structures
	  ○ Air quality and pollutants

8. Plant interior landscape plants	• Depth • Drawings and specifications • Mulch • Irrigation • Prune • Site requirements
9. Verify plant installation	• Moisture content • Plant health • Drawings and specifications
10. Clean up site	• Excess materials • Contract documents • Floors, walls, ceilings • Furniture and structures

Line (GAC): L MAINTAIN HARDSCAPE

Competency: L2 Maintain landscape structures

Objectives

To be competent in this area, the individual must be able to:

- Describe maintenance requirements for landscape structures.

LEARNING TASKS	CONTENT
1. Inspect structures for defects and hazards	• Peeling paint • Rotting wood • Heaving and settling • Compromised hardware

2. Describe maintenance procedures for landscape structures	• Blow
	• Acid wash
	• Paint
	• Stain
	• Clean
	  ○ Scrub
	  ○ Sweep
	• Specifications and standards

Line (GAC): L MAINTAIN HARDSCAPE

Competency: L5 Maintain irrigation systems

Objectives

To be competent in this area, the individual must be able to:

- Describe maintenance procedures.
- Describe requirements for irrigation system start-up and maintenance.
- Describe irrigation system auditing and scheduling procedures.

LEARNING TASKS	CONTENT
1. Describe maintenance requirements	• Spring start up • Seasonal operation • Winterization
2. Describe start-up to determine functioning of system	• Heads • Nozzles ○ Spray patterns • Pipes • Valves • Electrical components • Controllers
3. Describe problems	• Troubleshoot • Water velocity • Landscape changes • Plant growth • Vandalism
4. Describe solutions	• Program scheduling • Head adjustments • Cleaning • Sensors • Landscape adjustments
5. Describe water stewardship practices	• Irrigation systems scheduling • Irrigation system auditing ○ Irrigation Industry Association of BC

Line (GAC): L MAINTAIN HARDSCAPE

Competency: L6 Maintain water features

Objectives

To be competent in this area, the individual must be able to:

- Describe maintenance requirements for water features.

LEARNING TASKS	CONTENT
1. Describe inspection of water features for defects	• Cracks • Leaks • Plugged filters • Faulty gaskets and seals • Debris • Undesireable growth
2. Describe the process for charging systems and replacing pumps	• Pump priming • Start up operations
3. Describe the process for setting and resetting timers	• Manufacturer's specifications • Contract requirements
4. Describe the process for draining and refilling features	• Jurisdictional regulations • Seasonal maintenance • Plant and fish protection
5. Describe the process for running systems to ensure functioning	• Manufacturer's specifications
6. Describe the process for inspecting and testing water conditions	• Lack of clarity • Presence of algae • Floating debris • Level • pH levels • Presence of bacteria
7. Describe the process for testing ground fault circuit interrupter (GFCI)	• Canadian Standards Association (CSA)
8. Describe the process for cleaning of components	• Filters • Screens • Nozzles • Pumps • Skimmers
9. Describe cleaning of water features	• Basins • Fountains • Aquatic products
10. Describe problems with water features	• Water amendment ○ Aquatic products • Flow rates adjustment

LEARNING TASKS	CONTENT
11. Describe the process for winterizing of water features	• Landscape element adjustment • Draining • Disconnecting • Disassembling • Covering • Avoiding damage • Storing • Manufacturers' specifications

Line (GAC): L MAINTAIN HARDSCAPE

Competency: L7 Maintain landscape lighting

Objectives

To be competent in this area, the individual must be able to:

- Describe maintenance requirements for landscape lighting.

LEARNING TASKS	CONTENT

1. Describe visual inspection of lighting components	• Defect detection
	  ○ Flickering
	  ○ Illumination
	• Fixtures
	• Lamps
	• Fuses
	• Transformers
	• Connectors

2. Describe adjustment of lighting components	• Fixture positioning • Coverage • Timer ○ Seasonal requirements • Voltage levels • Exposed wires • Documentation pertaining to low voltage lighting
3. Describe cleaning and clearing of lighting components	• Sensors • Debris • Fixtures

Line (GAC): L MAINTAIN HARDSCAPE

Competency: L8 Practice snow and ice control

Objectives

To be competent in this area, the individual must be able to:

- Describe ice and snow removal considerations.

LEARNING TASKS	CONTENT

1. Select and use tools and equipment	• Vehicles with blades
	• Blowers
	  ○ Walk-behind
	  ○ Tractor mounted
	  ○ Backpack
	• Spreaders
	• Snow shovels
	• Loaders
	• Graders

2. Describe snow clearing	• Storage locations • Removal requirements • Potential damage to landscape elements • Access points • Contract documents • Jurisdictional regulations • Snow markers • Site requirements
3. Describe application of ice control products	• Contract documents • Jurisdictional regulations • Industry standards • Site requirements • Potential damage to landscape elements
4. Describe installation of protective structures	• Snow fence • Wind breaks

5. Describe weather monitoring factors	• Conditions
	  ○ Precipitation
	  ○ Wind
	• Scheduling
	• Equipment selection
	• Material selection
	• Inventory

Line (GAC): L MAINTAIN HARDSCAPE

Competency: L9 Repair hardscape

Objectives

To be competent in this area the individual must be able to:

- Describe hardscape repair.

LEARNING TASKS	CONTENT

1. Recognize damage to hardscapes	• Damage
	  ○ Cracks
	  ○ Frost heave
	  ○ Spalling
	  ○ Settling
	• Issues
	  ○ Damaged pipes
	  ○ Plugged catch basins
	  ○ pooling

2. Describe minor repairs	• Damaged stones • Damaged timber • Pipes • Leveling structures • Mortar • Adhesives • Sealants • Lift and re-lay ○ Slope regrading • Aggregate surfaces • Low voltage cable • Standards and specifications

Le Line (GAC): M MAINTAIN SOFTSCAPE

Competency: M2 Maintain interior softscape

Objectives

To be competent in this area, the individual must be able to:

- Describe seasonal plant replacement.
- Describe cultivation and amendment of growing media.
- Describe irrigation and fertilization of plants.

LEARNING TASKS	CONTENT
1. Identify interior plants and their needs	• Water • Light • Nutrients
2. Identify pests and diseases	• Types • Causes • Integrated Pest Management (IPM)

3. Perform visual inspection	• Plant health
	• Appearance
	• Growth habit
	• Growing media
	  ○ Crusting
	  ○ Salinity

4. Discuss irrigation and fertilization of plants	• Quality of irrigation water
	• Frequency
	• Fertilization Rates and types
	• Methods
	  ○ Manual
	  ○ Automatic

5. Discuss cultivation and amendment of growing media	• Aeration
	• Aesthetics
	• Growing media depth and levels
	• Amendments
	  ○ Perilite
	  ○ Vermiculite
	  ○ Coir
	  ○ Peat moss
	  ○ Mycorrhizae
	• Mulch
	  ○ Organic
	  ○ inorganic

6. Discuss cleaning of foliage and containers	• Aesthetics • Plant health • Damage

LEARNING TASKS	CONTENT
7. Discuss seasonal plant replacement	• Health • Aesthetics • Contract documents
8. Discuss protection of interior furnishings and surfaces	• Floors, walls, ceilings • Furniture and structures • Contract documents • Standards and specifications
9. Discuss pruning of interior plants	• Dead, disease, damaged • Space restrictions • Codes and regulations • Plant health • Aesthetics

10. Discuss managing growth for site conditions	• Pot-on and divide interior plants
	• Improving aesthetic
	• Root prune
	  ○ Growth control
	  ○ Soil volume
	  ○ Girdling roots

11. Discuss movement and rotation of plant	• Uniform growth • Changing light • Space requirements • Codes and regulations

Line (GAC): M MAINTAIN SOFTSCAPE

Competency: M5 Repair softscape

Objectives

To be competent in this area, the individual must be able to:

- Describe management and repair of plant material.
- Describe management and repair of landscape materials.

LEARNING TASKS	CONTENT

1. Describe management of damaged plant material	• Plant requirements
	• Standards and specifications
	• Structural supports
	  ○ Cabling
	  ○ Bracing
	  ○ Staking
	  ○ Propping
	• Pruning
	• Amending soils

2. Describe reasons for replacing interior and exterior plants	• Dead, Damaged, Diseased
	• Maintenance level
	• Contract documents
	• Threshhold levels
	  ○ IPM
	  ○ Client preference
	  ○ Species
	  ○ Appearance

3. Describe repair of natural and manufactured edges	• Standards and specifications • Brick • Plastic • Alluminum • Wood
4. Describe repair and adjustment of staking and guying materials	• Prevention of plant damage • Standards and specifications
5. Describe repair of grading and drainage	• Standards and specifications
6. Describe reasons for replacing growing media	• Test results • Non-viable • Pernicious pests • Jurisdictional regulations

7. Describe repair of inorganic mulch	• Materials
	  ○ Filter fabric permeability
	  ○ Aggregate
	  ○ Rubber

LEARNING TASKS	CONTENT

	• Methods
	  ○ Cleaning
	  ○ Replenishing
	  ○ Releveling
	  ○ Replacing

Level 4

Landscape Horticulturist

Line (GAC): C ORGANIZE WORK

Competency: C1 Perform site assessments

Objectives

To be competent in this area, the individual must be able to:

- Inspect site specific environmental conditions.

LEARNING TASKS	CONTENT
1. Inspect site specific environmental conditions	• Green infrastructure • Design intent • Sun and shade • Microclimates
2. Evaluate soil erosion	• Construction impact or change in site conditions • Watering practices • Exposure • Slope • Soil characteristics

Line (GAC): C ORGANIZE WORK

Competency: C2 Use documentation and reference material

Objectives

To be competent in this area, the individual must be able to:

- Interpret landscape drawings and design intent.
- Reference documentation pertaining to estimating.

LEARNING TASKS	CONTENT

1. Interpret landscape drawings and design intent	• Design principles
	• Plant list
	• Notes
	• Specifications
	• Site protection areas
	• Construction and landscape plans
	  ○ Site plan
	  ○ Layout plan
	  ○ Grading plan
	  ○ Planting plan
	  ○ Lighting plan
	• Detailed drawings
	  ○ Section view
	• Section elevations
	• Perspective
	• Line weight
	• Exploded view

2. Reference documentation pertaining to estimating	• Tenders • Bid documents • General conditions • Supplementary conditions • Standard form of contract ○ CCDC (Canadian Construction Documents Committee) • Codes • Standards

Line (GAC): C ORGANIZE WORK

Competency: C3 Maintain records

Objectives

To be competent in this area, the individual must be able to:

- Describe examples of additional records.
- Describe types of work records.

LEARNING TASKS	CONTENT

1. Describe examples of additional records	• Integrated pest management program (IPM)
	• Jurisdictional regulations
	  ○ Driver's abstract
	  ○ Work permits
	  ○ Certification records

2. Describe types of work records	• Work orders • Training records • Daily time sheets • Change orders • Site assessment records • Employee evaluations

Line (GAC): C ORGANIZE WORK

Competency: C4 Participate in job planning activities

Objectives

To be competent in this area, the individual must be able to:

- Identify and schedule labour, materials, tools and equipment.
- Verify scope of project and determine sequence of job.

LEARNING TASKS	CONTENT

1. Identify labour requirements	• Skill level
	• Production hours
	• Project requirements
	  ○ Weather
	  ○ Materials and equipment
	  ○ Jurisdictional regulations

2. Schedule labour, materials, tools and equipment	• Competing projects • Potential challenges • Site assessments • Designated timelines • Personnel • Sequence of work • On-site staging • Contract documents • Historical information • Previous records
3. Identify and schedule sub-contractors	• Scope of work • Contract documents • Jurisdictional regulations
4. Verify scope of project and determine sequence of job	• Plan • Budget • Bottlenecks
5. Plan site-specific staging	• Environmental protection • Vehicle parking • Storage • Portable offices • Toilets • Space availability

Line (GAC): D PARTICIPATE IN MARKETING AND SALES

Competency: D4 Prepare estimates

Objectives

To be competent in this area, the individual must be able to:

- Prepare estimates for basic landscape installation projects.

LEARNING TASKS	CONTENT
1. Interpret site information and documentation	• Drawings • Specifications • Tendering documents • Client instructions • Digital mapping
2. Identify sources of information pertaining to estimating	• Suppliers • RSMeans Cost Data • Referenced standards and definitions

3. Estimate material costs	• Quantity take off
	  ○ Length
	  ○ Area
	  ○ Volume
	• Materials
	  ○ Aggregates
	  ○ Lumber
	  ○ Mulch
	  ○ Plants
	  ○ Growing media
	  ○ Rates of application
	• Expansion and compaction factors
	• Pricing

4. Estimate labour costs	• Job requirements • Historical data • Labour productivity • Skill level • Scheduling • Wages and labour burden
5. Estimate equipment costs	• Job requirements • Historical data • Rental • Availability • Site considerations • Hourly operational cost
6. Estimate additional costs	• Sub-contractors • Direct job overhead costs

LEARNING TASKS	CONTENT
	○ Transportation ○ Change orders ○ Accommodations ○ Permits ○ Waste disposal ○ Surcharges • Indirect job overhead costs ○ Safety program ○ Administrative overhead – Insurance • Contingencies ○ Weather • Profit ○ Risk
7. Coordinate project logistics	• Logistical issues ○ Skill requirements ○ Scheduling ○ Equipment availability • Coordination ○ Suppliers ○ Employees ○ Contractors
8. Provide estimates	• Contract documents • Recapitulation • Profit taxes • Time line/deadline

Line (GAC): E USE COMMUNICATION AND MENTORING TECHNIQUES

Competency: E2 Use mentoring techniques

Objectives

To be competent in this area, the individual must be able to:

- Describe the role and responsibilities of a mentor.
- Describe the skills of a mentor.

LEARNING TASKS	CONTENT

1. Describe leadership in the organization	• Definition of leadership
	• Role of leaders
	• Characteristics of leaders
	• Leadership skills
	  ○ Delegation
	  ○ Goal Setting
	  ○ Coaching
	  ○ Training

2. Define the roles and responsibilities of the mentor	• Communication • Training • Modelling • Supporting • Enforcing • Ensuring skills progression • Assessing suitability
3. Describe training skills	• Lessson objectives • Messaging • Explanations • Linking lessons • Demonstration • Practice • Assessing • Adjusting lesson • Supportive and corrective feedback

4. Describe learning styles and needs	• Preferences
	  ○ Visual
	  ○ Auditory
	  ○ Kinesthetic
	• Learning disabilities
	• Language proficiency

5. Describe the value of essential skills in the workplace	• Reading • Writing • Document use

LEARNING TASKS	CONTENT
	• Oral communication • Numeracy • Thinking • Working with others • Digital technology • Continuous learning
6. Manage time	• Role of the supervisor • Ability to effectively manage personal and work time
7. Examine the concept of power in an organization	• Recognizing power structure • How power is applied
8. Recognize ethical and social responsibility issues in the work place	• Individual perspectives and experiences • Organizational ethics • Jurisdictional regulations • Managing diversity • Corporate culture
9. Interpret the employment standards	• Impacts of the Employment Standards Act on horticultural operations

Line (GAC): F APPLY HORTICULTURAL PRACTICES

Competency: F2 Identify plants and plant requirements

Objectives

To be competent in this area, the individual must be able to:

- Identify plant and plant requirements for 90 woody and non-woody plants.
- Describe native and seasonal plants common to the horitculture industry in BC.
- Describe plants suitable for green infrastructure and edible landscapes.

LEARNING TASKS	CONTENT
1. Describe native plants common to the horticulture industry	• Trees • Shrubs • Groundcovers • Perennials • Biennials • Annuals • Provenance
2. Describe seasonal plants common to the horticulture industry in BC	• Exterior • Interior
3. Describe plants suitable for green infrastructure projects	• Green roofs • Green walls • Bioswales • Rain gardens
4. Describe plants suitable for edible landscapes	• Jurisdictional regulations • Wildlife • Types • Design implications • Companion planting
5. Identify and describe 90 woody and non-woody plants	• Using botanical terms • According to its cultural and maintenance requirements

Line (GAC): F APPLY HORTICULTURAL PRACTICES

Competency: F5 Manage pests, diseases and invasive species

Objectives

To be competent in this area, the individual must be able to:

- Discuss implications of pest management in landscapes.
- Identify quarantine protocol.
- Develop an IPM program for a landscape.

LEARNING TASKS	CONTENT

1. Discuss the implications of pest management	• Regulations
	  ○ Federal
	  ○ Provincial
	  ○ Municpal
	• Purchase
	• Transportation
	• Storage
	• Use and disposal
	• Considerations in pest management
	  ○ Economic
	  ○ Aesthetic
	  ○ Environmental
	  ○ Social

2. Identify regulated versus non-regulated pests in BC	• Exotic • Invasive • Noxious • Introduced • Jurisdictional regulations
3. Identify quarantine protocols	• Early detection and eradication • Import/export restrictions • Containment or destruction of contaminated materials • Sanitation practices for tools, vehicles and equipment • Jurisdictional regulations • Standards and specifications
4. Prepare samples for lab testing	• Submission form • Sample collections • Shipment of sample as per lab specifications
5. Develop a diagnostic checklist	• Host plant identification • Abiotic/biotic • Patterns of signs and symptoms

LEARNING TASKS	CONTENT

6. Develop an IPM program	• Distribution
	  ○ Site
	  ○ Plant
	• Site history
	• Weather conditions
	• Seasonality
	• Geographic location
	• Phenology
	• Goals
	• Severity of pest damage
	• Maintenance level and site use
	• Costs of control vs. economic/aesthetic losses
	• Calculating risks

Achievement Criteria

Performance	The learner will develop an IPM program.
Conditions	The learner will be given the necessary materials, tools and equipment.
Criteria	The learner will score a passing grade of 70% or better on a rating sheet according to the following criteria: • Identified the pest and host plant • Integrated many control methods in a complementary fashion and justified selection of control methods • Established monitoring guidelines • Established the practical significance for the worksite • The IPM program listed potential risks with recommended solutions • Resource list showed appropriate breadth for the topic, including personnel used as resources, books, Ministry information, etc. • Established evaluation guidelines

Line (GAC): G APPLY ENVIRONMENTAL PRACTICES

Competency: G1 Practice environmental stewardship

Objectives

To be competent in this area, the individual must be able to:

- Discuss opportunities for stewardship related to green infrastructure and biodiversity.

LEARNING TASKS	CONTENT
1. Identify opportunities for stewardship related to green infrastructure and biodiversity	• Tools • Equipment • Plants • Materials • Disposal • Organized work flow • Site protection • Maintenance practices • Installation practices

Line (GAC): G APPLY ENVIRONMENTAL PRACTICES

Competency: G2 Practice biodiversity enhancement

Objectives

To be competent in this area, the individual must be able to:

- Describe a variety of habitats to support a range of organisms.
- Describe biodiverse enhancement strategies.

LEARNING TASKS	CONTENT
1. Define biodiversity	• Value • Purpose • Jurisdictional regulations

2. Describe selection of plants that ensure diversity within landscapes	• Aesthetics
	• Disease and pest resistance
	• Flower time
	• Plant type
	• Functions
	  ○ Edible
	  ○ Medicinal
	  ○ Cultural
	  ○ Structural
	  ○ Economic
	• Benefits
	  ○ Climate control
	  ○ Carbon capture
	  ○ Symbiotic relationships
	  ○ Pollution abatement
	  ○ Energy conservation
	  ○ Water infiltration
	• Age
	• Hydrozones
	• Jurisdictional regulations

3. Describe a variety of habitats that support a range of organisms	• Habitats
	  ○ Refuge and nesting sites
	  ○ Wildlife trees
	  ○ Water and food
	• Organisms
	  ○ Beneficial insects
	  – Pollinators
	  – Biological controls
	  ○ Mycorrhizae and other soil biota
	  ○ Birds

4. Describe bio-diverse enhancement strategies	• 'Let it lay' • Spring cleanup versus fall cleanup

LEARNING TASKS	CONTENT
	• Reduced chemical use • Plant selection and design • Product selection

Line (GAC): H PERFORM PRE-CONSTRUCTION ACTIVITIES

Competency: H1 Participate in landscape design activities

Objectives

To be competent in this area, the individual must be able to:

- Describe the principles of garden design.
- Participate in landscape design activities.
- Create a planting plan.

LEARNING TASKS	CONTENT
1. Select and use tools	• Levels • GPS • Measuring devices • Scaling devices • Compass • Ruler • Computer • Trace paper • Drafting pencil
2. Perform site measurements	• Grade levels • Stake interpretation • Grid system • Triangulation
3. Examine influential historical and cultural landscape styles	• Formal vs. informal • Historical and cultural influences • Contemporary styles

4. Examine sustainable approaches of design and contemporary gardens	• Xeriscaping
	• Green infrastructure
	  ○ Rain gardens
	  ○ Green roofs
	• Maintenance considerations
	• Use of native plants in the landscape
	• SITES (Sustainable Sites Inititative)
	• Site specific design

5. Describe the design characteristics of plants and materials	• Colour • Form • Texture • Size
6. Describe the principles of design	• Order • Unity • Rhythm
7. Describe the elements of design	• Simplicity

LEARNING TASKS	CONTENT
	• Variety • Balance • Emphasis • Scale • Sequence

8. Describe the design process	• Project research and preparation
	  ○ Client consultation
	  ○ Presenting the portfolio
	  ○ Available services and fees
	  ○ Proposal for design services
	  ○ Jurisdictional regulations
	• Site plan and analysis
	  ○ Site inventory
	  ○ Site measurements
	  ○ Site analysis
	  ○ Design objectives
	• Preliminary design phase
	  ○ Functional drawings
	  ○ Conceptual drawings
	• Design phase
	  ○ Construction documentation
	  ○ Layout plan
	  ○ Grading plan
	  ○ Planting plan
	  ○ Irrigation plan
	  ○ Lighting plan
	  ○ Detail drawings
	  ○ Master plan
	• Site preparation
	  ○ Marking
	  ○ Staking
	• Installation
	• Maintenance
	• Evaluation

9. Identify components of a landscape drawing	• Scale • Copyright • Drawing specifications • Notes • Title block • Directional arrow • Drawing title
10. Describe the functions of the site	• Outdoor use areas • Outside rooms

LEARNING TASKS	CONTENT
	• Recreation space • Outdoor work or service area • Public space • Site ecology

11. Create a preliminary design	• Form composition
	• Plant function
	• Suitability
	  ○ Exposure
	  ○ Macroclimate
	  ○ Microclimate
	  ○ Soil conditions
	  ○ Hydrozones
	• Structures
	  ○ Fences and walls
	  ○ Overhead structures
	  ○ Walkways, paths and driveways
	  ○ Materials and maintenance

12. Create a planting plan	• Plant list
	• Graphic conventions
	  ○ Line weight
	  ○ Symbols
	• Plant spacing
	• Plant availability

Achievement Criteria

Performance	The learner will create a planting plan.
Conditions	The learner will be given the necessary materials, tools and equipment.
Criteria	The learner will score a passing grade of 70% or better on a rating sheet according to the following criteria: • Produced a complete planting plan incorporating design characteristics

Line (GAC): K INSTALL GREEN INFRASTRUCTURE SYSTEMS

Competency: K1 Select green infrastructure

Objectives

To be competent in this area, the individual must be able to:

- Select green infrastructure technologies, methods and products.
- Identify benefits and applications of green infrastructure technologies.

LEARNING TASKS	CONTENT

1. Describe factors affecting the selection of green infrastructure	• Site specific conditions
	  ○ Environmental
	  – Water flow
	  – Topography
	  – Drainage patterns
	  – Growing media
	  – Existing vegetation
	  ○ Construction limitations
	  – Structural load
	  – Building envelope
	  – Drainage
	• Natural ecosystem considerations
	  ○ Function
	  ○ Purpose
	  ○ Structure
	• Budget
	• Jurisdictional regulations
	  ○ Community plans
	• Client needs
	• Product availability
	• Design considerations

2. Identify benefits and applications of green infrastructure technologies	• Biodiversity • Water conservation ○ Smart water technology • Rain/stormwater management • Climate control • Air purification • Reduced heat island effect • Protecting natural resources • Site sustainability
3. Select green infrastructure technologies, methods and products	• Site conditions • Materials and equipment • Site access • Certification and personnel qualifications

LEARNING TASKS	CONTENT
	• Filtration systems • Low impact development
4. Identify green infrastructure systems	• Living walls • Green roofs • Rain gardens • Bioretention pond • Green parking • Permeable pavement • Bioswales • Urban forest • Engineered wetlands
5. Compare types of green, blue and grey infrastructures	• Feasibility • Cost • Environmental impact • Aesthetics • Maintenance
6. Identify benefits of plants within green infrastructure systems	• System functionality • Ecosystems service benefits • Carbon sequestration • Symbiotic relationships • Pollution mitigation • Cost savings
7. Identify benefits of the urban forest	• Environmental • Economic • Social

Line (GAC): K INSTALL GREEN INFRASTRUCTURE SYSTEMS

Competency: K2 Install green roofs and walls

Objectives

To be competent in this area, the individual must be able to:

- Describe the components of green roofs and walls.
- Describe the procedure for installation of green roofs and walls.

LEARNING TASKS	CONTENT
1. Identify tools and equipment	• Lifts • Booms • Cranes • Fall protection equipment
2. Describe types and functions of green roof systems	• Extensive • Intensive
3. Describe the process and procedures to install green roofs and walls	• Site preparation • Growing media • Plant material • Safe working procedures ○ Fall protection • Jurisdictional regulations
4. Describe the non-organic components used in green roofs and walls	• Membranes • Root barriers • Drainage • Irrigation • Pumps • Ballasts
5. Describe the characteristics of organic components used in green roofs and walls	• Growing media • Plant material

Line (GAC): K INSTALL GREEN INFRASTRUCTURE SYSTEMS

Competency: K3 Install rainwater and stormwater management systems

Objectives

To be competent in this area, the individual must be able to:

- Describe the components of rainwater/stormwater management, harvesting, and retention systems.
- Describe the procedure for installation of rainwater/stormwater systems.

LEARNING TASKS	CONTENT
1. Describe types and functions of rainwater/stormwater management systems	• Management • Harvesting • Retention
2. Describe the process and procedures to install rainwater/stormwater systems	• Site preparation • Growing media • Plant material • Safe working procedures • Jurisdictional regulations
3. Describe the components of rainwater/stormwater management systems	• Growing media • Plant materials • Aggregates • Liners • Biofilters • Water aerators
4. Describe the components of rainwater/ stormwater harvesting systems	• Cisterns • Pumps • Hoses • Valves • Pipes • Aggregates • Rain barrels • Tanks • Irrigation systems • Soil cells • Water harvesting crates
5. Describe the components of rainwater/ stormwater retention systems	• Growing media • Plant materials • Aggregates • Liners • Biofilters • Water aerators

Line (GAC): K INSTALL GREEN INFRASTRUCTURE SYSTEMS

Competency: K4 Install erosion control

Objectives

To be competent in this area, the individual must be able to:

- Describe erosion control materials and methods of installation.

LEARNING TASKS	CONTENT

1. Describe tools and equipment	• Tools
	  ○ Shovels
	  ○ Post pounders
	  ○ Knives
	• Equipment
	  ○ Augers
	  ○ Trenchers
	  ○ Loaders

2. Identify erosion control methods and their application	• Silt fencing
	• Gabion walls
	• Roll-type materials
	  ○ Tarps
	  ○ Mats
	  ○ Blankets
	• Wattles
	• Plant materials
	• Boulders
	• Aggregates

3. Describe installation methods	• Site preparation • Placement • Securement • Verification • Disposal • Jurisdictional regulations

Line (GAC): K INSTALL GREEN INFRASTRUCTURE SYSTEMS

Competency: K5 Install biodiverse plantings and natural areas

Objectives

To be competent in this area, the individual must be able to:

- Describe installation considerations and procedures for biodiverse plantings and natural areas.

LEARNING TASKS	CONTENT

1. Describe installation considerations for biodiverse plantings and natural areas	• Environmental stewardship
	  ○ Minimal disturbances
	• Site preparation
	  ○ Protection of sensitive areas
	• Verification
	• Disposal
	• Jurisdictional regulations
	• Industry standards
	  ○ CLS exceptions for natural areas

2. Describe installation procedures for biodiverse plantings and natural areas	• Stock inspection • Plant preparation • Layout • Installation • Protection and stabilization • Monitoring • Organic mulch

Line (GAC): N MAINTAIN GREEN INFRASTRUCTURE

Competency: N1 Maintain green roofs and walls

Objectives

To be competent in this area, the individual must be able to:

- Describe processes and procedures for maintaining green roofs and walls.
- Identify non-horticultural elements requiring inspection and maintenance.

LEARNING TASKS	CONTENT

1. Describe processes and procedures for maintaining green roofs and walls	• Debris removal
	• Weed control
	• Pests and diseases control
	  ○ Fertilizer application
	• Irrigation
	• Plant coverage assessment
	• Plant pruning
	• Growing media inspection
	• Jurisdictional regulations
	  ○ Fall protection

2. Identify non-horticultural elements requiring inspection and maintenance	• Leak detection
	• Exposed membrane
	• Vents
	• Drainage system
	  ○ Standing water
	  ○ Sedimentation
	  ○ Drain pathways
	• Pumps
	• Pipes

Line (GAC): N MAINTAIN GREEN INFRASTRUCTURE

Competency: N2 Maintain rainwater and stormwater management systems

Objectives

To be competent in this area, the individual must be able to:

- Describe processes and procedures for maintaining the function of rainwater and stormwater management systems.
- Identify non-horticultural elements requiring inspection and maintenance.

LEARNING TASKS	CONTENT

1. Describe processes and procedures for maintaining the function of rainwater and stormwater management systems	• Debris removal
	• Weed control
	• Pests and diseases control
	• Fertilizer application
	• Plant health assessment
	• Plant pruning
	• Mulch assessment
	  ○ Depth
	  ○ Quality
	• Growing media inspection
	  ○ Erosion
	  ○ Viability
	• Water testing
	• Jurisdictional regulations
	  ○ Fall protection

2. Identify non-horticultural elements requiring inspection and maintenance	• Leak detection
	• Exposed membrane
	• Vents
	• Drainage system
	  ○ Standing water
	  ○ Sedimentation
	  ○ Drain pathways
	• Pumps
	• Pipes
	• Mesh
	• Filters
	• Basins
	• Inlet channels and outlet channels
	• Cisterns

Line (GAC): N MAINTAIN GREEN INFRASTRUCTURE

Competency: N3 Maintain erosion control

Objectives

To be competent in this area, the individual must be able to:

- Describe the procedures to inspect and repair erosion control materials.

LEARNING TASKS	CONTENT

1. Describe the procedures to inspect erosion control materials	• Functionality
	  ○ Sloughing
	  ○ Rilling
	  ○ Gullies
	  ○ Sedimentation
	  ○ Flooding
	  ○ Weed control

2. Describe the procedures to repair erosion control materials	• Industry standards • Jurisdictional regulations

Line (GAC): N MAINTAIN GREEN INFRASTRUCTURE

Competency: N4 Maintain biodiverse plantings and natural areas

Objectives

To be competent in this area, the individual must be able to:

- Identify criteria for monitoring site.
- Describe maintenance procedures.

LEARNING TASKS	CONTENT

1. Identify criteria for monitoring site	• Safe public access
	• Site disturbances
	  ○ Erosion
	  ○ Vandalism
	  ○ Illegal camping
	  ○ Dumping
	• Public safety
	• Plant health
	  ○ Invasive and unwanted species
	• Plant establishment
	• Contract documents

2. Describe maintenance procedures	• Reporting
	• Ensuring integrity of pathways
	• Removal
	• Pruning
	• Planting
	• Plant protection
	  ○ Tree guards
	  ○ Fencing

Section 4

ASSESSMENT GUIDELINES

Assessment Guidelines – Level 1

Level 1 Grading Sheet: Subject Competency and Weightings

PROGRAM: IN-SCHOOL TRAINING:	LANDSCAPE HORTICULTURIST LEVEL 1		
LINE	**SUBJECT COMPETENCIES**	**THEORY WEIGHTING**	**PRACTICAL WEIGHTING**
A	PERFORM SAFETY RELATED FUNCTIONS	5%	5%
B	USE TOOLS, EQUIPMENT AND VEHICLES	10%	0%
C	ORGANIZE WORK	10%	0%
E	USE COMMUNICATION AND MENTORING TECHNIQUES	2%	0%
F	APPLY HORTICULTURAL PRACTICES	20%	0%
G	APPLY ENVIRONMENTAL PRACTICES	15%	10%
H	PERFORM PRE-CONSTRUCTION ACTIVITIES	18%	50%
J	INSTALL SOFTSCAPE	15%	20%
M	MAINTAIN SOFTSCAPE	5%	15%
	Total	100%	100%
In-school theory & practical subject competency weighting		80%	20%
Final in-school mark Apprentices must achieve a minimum 70% for the final in-school mark to be eligible to write the Landscape Horticulturist Standardized Level exam.		IN-SCHOOL %	

In-school Mark Combined theory and practical subject competency multiplied by	80%
Standardized Level Exam Mark The exam score is multiplied by	20%
Final Level Mark	FINAL%

Assessment Guidelines – Level 2

Level 2 Grading Sheet: Subject Competency and Weightings

PROGRAM: IN-SCHOOL TRAINING:	LANDSCAPE HORTICULTURIST LEVEL 2		
LINE	**SUBJECT COMPETENCIES**	**THEORY WEIGHTING**	**PRACTICAL WEIGHTING**
B	USE TOOLS, EQUIPMENT AND VEHICLES	10%	0%
C	ORGANIZE WORK	12%	0%
F	APPLY HORTICULTURAL PRACTICES	30%	25%
G	APPLY ENVIRONMENTAL PRACTICES	10%	0%
H	PERFORM PRE-CONSTRUCTION ACTIVITIES	5%	0%
I	INSTALL HARDSCAPE	15%	35%
J	INSTALL SOFTSCAPE	10%	40%
L	MAINTAIN HARDSCAPE	3%	0%
M	MAINTAIN SOFTSCAPE	5%	0%
	Total	100%	100%
In-school theory & practical subject competency weighting		70%	30%
Final in-school mark Apprentices must achieve a minimum 70% for the final in-school mark to be eligible to write the Landscape Horticulturist Standardized Level exam.		IN-SCHOOL %	

In-school Mark Combined theory and practical subject competency multiplied by	80%
Standardized Level Exam Mark The exam score is multiplied by	20%
Final Level Mark	FINAL%

Assessment Guidelines – Level 3

Level 3 Grading Sheet: Subject Competency and Weightings

PROGRAM: IN-SCHOOL TRAINING:	LANDSCAPE HORTICULTURIST LEVEL 3		
LINE	**SUBJECT COMPETENCIES**	**THEORY WEIGHTING**	**PRACTICAL WEIGHTING**
B	USE TOOLS, EQUIPMENT AND VEHICLES	5%	0%
C	ORGANIZE WORK	15%	20%
D	PARTICIPATE IN MARKETING AND SALES	2%	0%
F	APPLY HORTICULTURAL PRACTICES	35%	40%
G	APPLY ENVIRONMENTAL PRACTICES	7%	0%
I	INSTALL HARDSCAPE	20%	40%
J	INSTALL SOFTSCAPE	2%	0%
L	MAINTAIN HARDSCAPE	10%	0%
M	MAINTAIN SOFTSCAPE	4%	0%
	Total	100%	100%
In-school theory & practical subject competency weighting		80%	20%
Final in-school mark Apprentices must achieve a minimum 70% for the final in-school mark to be eligible to write the Landscape Horticulturist Standardized Level exam.		IN-SCHOOL %	

In-School Mark Combined theory and practical subject competency multiplied by	80%
Standardized Level Exam Mark The exam score is multiplied by	20%
Final Level Mark	FINAL%

Assessment Guidelines – Level 4

Level 4 Grading Sheet: Subject Competency and Weightings

PROGRAM: IN-SCHOOL TRAINING:	LANDSCAPE HORTICULTURIST LEVEL 4		
LINE	**SUBJECT COMPETENCIES**	**THEORY WEIGHTING**	**PRACTICAL WEIGHTING**
C	ORGANIZE WORK	10%	0%
D	PARTICIPATE IN MARKETING AND SALES	10%	0%
E	USE COMMUNICATION AND MENTORING TECHNIQUES	3%	0%
F	APPLY HORTICULTURAL PRACTICES	30%	50%
G	APPLY ENVIRONMENTAL PRACTICES	7%	0%
H	PERFORM PRE-CONSTRUCTION ACTIVITIES	10%	50%
K	INSTALL GREEN INFRASTRUCTURE SYSTEMS	25%	0%
N	MAINTAIN GREEN INFRASTRUCTURE	5%	0%
	Total	100%	100%
In-school theory & practical subject competency weighting		85%	15%
Final in-school mark Apprentices must achieve a minimum 70% as the final in-school mark to be eligible to write the Landscape Horticulturist Interprovincial Red Seal exam.		IN-SCHOOL %	

All apprentices who complete Level 4 of the Landscape Horticulturist program with a FINAL level mark of 70% or greater will write the Interprovincial Red Seal examination as their final assessment.

SkilledTradesBC will enter the apprentices' Landscape Horticulture Red Seal Interprovincial examination mark in SkilledTradesBC Portal. A minimum mark of 70% on the examination is required for a pass.

Section 4

TRAINING PROVIDER STANDARDS

Facility Requirements

LEVEL ONE

Classroom Area

- Approximately 900 square feet
- Comfortable seating and tables suitable for training, teaching, lecturing and drafting
- Compliance with all local and national fire code and occupational safety requirements
- Lighting controls to allow easy visibility of projection screen while also allowing students to take notes
- Windows must have shades or blinds to adjust sunlight
- Heating/Air conditioning for comfort all year round
- In-room temperature regulation to ensure comfortable room temperature
- In-room ventilation sufficient to control training room temperature
- Acoustics in the room must allow audibility of the instructor
- White marking board with pens and eraser (optional: flipchart in similar size)
- Projection screen or projection area at front of classroom
- Overhead projector and a multi-media (data) projector

Shop Area

- Access to a service bay – approximately 600 square feet
- Access to a site for equipment operation – minimum 1 acre
- Access to all tools and equipment as listed for Level One

Lab Requirements

- Botany or Science teaching lab outfitted with compound and dissecting microscopes - approximately 600 square feet
    - Access to live 'in situ' plant material as well as herbaria, and visual samples (slides, photographic databases, etc.)
    - Microscope slides of showing root, stem and leaf anatomy (monocot and dicot)
    - Microscope slides showing woody stem growth
    - Hand lens (10X)
    - Glassware, lamps, stir plate (with heating capacity)
    - Refrigerator and microwave
    - Collection of arthropods, disease organisms, and examples of plant stress
- Soil Science or Chemistry teaching lab - approximately 600 square feet
    - Glassware, lamps, stir plate (with heating capacity)
    - Refrigerator, access to a drying oven and microwave
    - Nested sieves, shakers, scales
    - Access to Hydrometers and sedimentation cylinders
    - Munsell colour books (recommended)

Student Facilities

- Adequate lunch room as per WorkSafeBC requirements
- Adequate washroom facilities as per WorkSafeBC requirements
- Personal storage lockers

Instructor's Office Space

- Suitable space and office furniture necessary for instructor to prepare lessons and secure file records

Other

- Access to botanical gardens

LEVEL TWO

Classroom Area

- Approximately 900 square feet
- Comfortable seating and tables suitable for training, teaching, lecturing and drafting
- Compliance with all local and national fire code and occupational safety requirements
- Lighting controls to allow easy visibility of projection screen while also allowing students to take notes
- Windows must have shades or blinds to adjust sunlight
- Heating/Air conditioning for comfort all year round
- In-room temperature regulation to ensure comfortable room temperature
- In-room ventilation sufficient to control training room temperature
- Acoustics in the room must allow audibility of the instructor
- White marking board with pens and eraser (optional: flipchart in similar size)
- Projection screen or projection area at front of classroom
- Overhead projector and a multi-media (data) projector

Shop Area

- Access to a service bay – approximately 600 square feet
- Access to a site for equipment operation – minimum 1 acre
- Access to all tools and equipment as listed for Level Two

Lab Requirements

- Botany or Science teaching lab outfitted with compound and dissecting microscopes - approximately 600 square feet
    - Access to live 'in situ' plant material as well as herbaria, and visual samples (slides, photographic databases, etc.)
    - Microscope slides showing root, stem and leaf anatomy (monocot and dicot)
    - Microscope slides showing woody stem growth
    - Hand lens (10X)
    - Glassware, lamps, stir plate (with heating capacity)
    - Refrigerator and microwave
    - Collection of arthropods, disease organisms, and examples of plant stress
- Soil Science or Chemistry teaching lab - approximately 600 square feet
    - Glassware, lamps, stir plate (with heating capacity)
    - Refrigerator, access to a drying oven and microwave
    - Nested sieves, shakers, scales
    - Access to Hydrometers and sedimentation cylinders
    - Munsell colour books (recommended)
    - pH meters
    - Soil sampling equipment

Student Facilities

- Adequate lunch room as per WorkSafeBC requirements

- Adequate washroom facilities as per WorkSafeBC requirements
- Personal storage lockers

Instructor's Office Space

- Suitable space and office furniture necessary for instructor to prepare lessons and secure file records

Other

- Access to a botanical garden
- Access to container nursery stock
- Access to field-grown stock/plant material that can be prepared for transplanting
- Trailer and tractor nursery equipment
- Access to large tree transplanting equipment
- Nursery hand carts and tree dollies
- Multiple nursery stock containers

LEVEL THREE

Classroom Area

- Approximately 900 square feet
- Comfortable seating and tables suitable for training, teaching, lecturing and drafting
- Compliance with all local and national fire code and occupational safety requirements
- Lighting controls to allow easy visibility of projection screen while also allowing students to take notes
- Windows must have shades or blinds to adjust sunlight
- Heating/Air conditioning for comfort all year round
- In-room temperature regulation to ensure comfortable room temperature
- In-room ventilation sufficient to control training room temperature
- Acoustics in the room must allow audibility of the instructor
- White marking board with pens and eraser (optional: flipchart in similar size)
- Projection screen or projection area at front of classroom
- Overhead projector and a multi-media (data) projector

Shop Area

- Access to a service bay – approximately 600 square feet
- Access to a site for equipment operation – minimum 1 acre
- Access to all tools and equipment as listed for Level Three

Lab Requirements

- Botany or Science teaching lab outfitted with compound and dissecting microscopes - approximately 600 square feet
  - Access to live 'in situ' plant material as well as herbaria, and visual samples (slides, photographic databases, etc.)
  - Hand lens (10X)
  - Glassware, lamps, stir plate (with heating capacity)
  - Refrigerator and microwave
  - Collection of arthropods, disease organisms, and examples of plant stress
- Soil Science or Chemistry teaching lab - approximately 600 square feet
  - Glassware, lamps, stir plate (with heating capacity)
  - Refrigerator, access to a drying oven and microwave
  - Nested sieves, shakers, scales
  - Access to Hydrometers and sedimentation cylinders
  - Munsell colour books (recommended)
  - pH meters
  - Soil sampling equipment

Student Facilities

- Adequate lunch room as per WorkSafeBC requirements
- Adequate washroom facilities as per WorkSafeBC requirements
- Personal storage lockers

Instructor's Office Space

- Suitable space and office furniture necessary for instructor to prepare lessons and secure file records

Other

- Access to a botanical garden
- Access to live 'in situ' plant material for pruning
- Access to plant material for planting and staking
- Landscape plans and specifications
- Access to installation site
- Access to installation supplies (for hardscapes)
- Access to appropriate site for installations and maintenance of irrigation and drainage
- Range of landscape design periodicals

LEVEL FOUR

Classroom Area

- Approximately 900 square feet
- Comfortable seating and tables suitable for training, teaching, lecturing and drafting
- Compliance with all local and national fire code and occupational safety requirements
- Lighting controls to allow easy visibility of projection screen while also allowing students to take notes
- Windows must have shades or blinds to adjust sunlight
- Heating/Air conditioning for comfort all year round
- In-room temperature regulation to ensure comfortable room temperature
- In-room ventilation sufficient to control training room temperature
- Acoustics in the room must allow audibility of the instructor
- White marking board with pens and eraser (optional: flipchart in similar size)
- Projection screen or projection area at front of classroom
- Overhead projector and a multi-media (data) projector

Shop Area

- Access to a service bay – approximately 600 square feet
- Access to a site for equipment operation – minimum 1 acre
- Access to all tools and equipment as listed for Level Four

Lab Requirements

- Botany or Science teaching lab outfitted with compound and dissecting microscopes - approximately 600 square feet
    - Access to live 'in situ' plant material as well as herbaria, and visual samples (slides, photographic databases, etc.)
    - Hand lens (10X)
    - Glassware, lamps, stir plate (with heating capacity)
    - Refrigerator and microwave
    - Collection of arthropods, disease organisms, and examples of plant stress
- Soil Science or Chemistry teaching lab - approximately 600 square feet
    - Glassware, lamps, stir plate (with heating capacity)
    - Refrigerator, access to a drying oven and microwave
    - Nested sieves, shakers, scales
    - Access to Hydrometers and sedimentation cylinders
    - Munsell colour books (recommended)
    - pH meters
    - Soil sampling equipment

Student Facilities

- Adequate lunch room as per WorkSafeBC requirements
- Adequate washroom facilities as per WorkSafeBC requirements
- Personal storage lockers

Instructor's Office Space

- Suitable space and office furniture necessary for instructor to prepare lessons and secure file records

Other

- Access to a botanical garden
- Access to live 'in situ' plant material for pruning
- Access to plant material for planting and staking
- Landscape plans and specifications
- Range of landscape design periodicals

Tools and Equipment

Hand Tools

Common

- brooms
- bypass pruners
- calculator
- cart
- files
- flags
- forks
- hammers
- handheld watering equipment
- hoes
- knives
- ladders
- levels
- plumb line
- rakes
- screwdrivers
- secateurs
- sharpening tools
- shovels
- spades
- sprinklers
- square
- tape measure
- tarps
- trowels
- hose
- watering can
- weed digger
- wheelbarrow
- wrenches

Level 1

- blocks
- chains
- core sampler/probe
- cultivator
- dibbler
- dolly
- edger
- grease gun
- hex keys
- microscope
- nursery cart
- picks
- pipe cutters
- roller
- spreaders
- shoring equipment
- sod lifter
- soil screener
- string line
- hand lens
- sod knife
- tie-downs

Level 2

- axe
- backpack sprayer
- blocks
- box cutters
- brick carriers
- brick splitter
- chains
- chisels
- core sampler/probe
- crimper
- crowbar
- cultivator
- dibbler
- dolly
- grease gun
- guillotine
- hard plane
- hand tamper
- handsaws
- hedge shears
- hex keys
- loppers
- microscope
- nursery cart
- paving stone cart
- paving stone extractor
- picks
- pliers
- post hole auger
- post maul
- post pounder
- pruning shears
- pry bar

Level 3

- axe
- backpack sprayer
- box cutters
- brick carriers
- brick splitter
- chains
- chisels
- crimper
- crowbar
- cultivator
- dolly
- edger
- grease gun
- hard plane
- handsaws
- hex keys
- loppers
- microscope
- nursery cart
- paving stone cart
- paving stone extractor
- picks
- pipe cutters
- pliers
- pole pruners
- pole saw
- post hole auger
- post maul
- post pounder
- pruning shears
- pry bar
- scaffolding
- scythe

Level 4

- post hole auger
- post maul
- post pounder
- compass

- screeding bars
- scythe
- spreaders
- shears
- shoring equipment
- side cutters
- soil screener
- hand lens
- tie-downs
- transplant table
- shoring equipment
- side cutters
- spreaders
- hand lens
- tie-downs
- tree cart
- water key
- weed torch
- wire cutters
- wire strippers

Power/Motorized Tools

Common	Level 1	Level 2	Level 3	Level 4
• attachments	• air seeder • core aerator • fertilizer injector • hydro-seeder • mechanical digger • mower • power seeder/spreader • trencher • walk-behind aerator	• circular saw • concrete saw • core aerator • demolition hammer (electric and pneumatic) • electric drill • fertilizer injector • grinder • mechanical digger • mitre/chop saw • mortar/cement mixer • mulcher • power auger • rototiller • power seeder/spreader • power soil screener • power/pressure washer • power wheelbarrow • reciprocating saw	• chainsaw • circular saw • concrete saw • demolition hammer (electric and pneumatic) • electric drill • grinder • hammer drill • heat gun • mechanical digger • mister • mitre/chop saw • mortar/cement mixer • powder-actuated tools • power auger • power sprayer • power/pressure washer • power wheelbarrow • reciprocating saw • sabre saw	• power auger

- sabre saw
- table saw
- tree spade
- trencher
- walk-behind aerator
- wet saw
- plate compactor
- vibrating plate tamper
- spider lift
- table saw
- torch
- trencher
- vacuum
- vacuum lifter
- wet saw
- plate compactor
- vibrating plate tamper

Measuring Equipment

Common	Level 1	Level 2	Level 3	Level 4
• engineer levels • laser distance measure • levels • measuring wheel • measuring tape • thermometer	• anemometer • barometer • compaction measuring device • light meter • graduated cylinders • moisture meter/sensor • pH meter • scales • tire pressure meter • tensiometer	• anemometer • barometer • compaction measuring device • EC meter • light meter • graduated cylinders • moisture meter/sensor • pH meter • scales • soil tester • tire pressure meter • tensiometer	• anemometer • barometer • catch can reader • compaction measuring device • flow meter • hygrometer • light meter • graduated cylinders • moisture meter/sensor • timers & controllers • voltmeter • water meter	• GPS • scale ruler

Motorized Equipment

Common	Level 1	Level 2	Level 3	Level 4
• excavator • flat deck truck • front end loader	• air compressor • bale breaker • bed edger • blowers	• air compressor • all-terrain vehicles • bale breaker • blower truck	• air compressor • bed edger • blowers • brush cutters	• backhoe • lifts • post hole auger • post pounder

- generator
- loaders
- compactor
- skid-steer
- sterilizer
- tractor
- truck
- forklift
- mower
- paddle broom
- pallet jack
- peat shredder
- dethatcher
- power rake
- power roller
- shredder
- slit seeder
- seed drill
- sod cutter
- soil screener
- trencher
- trimmers
- walk-behinds (various)
- blowers
- brush cutters
- clearing saw
- forklift
- hedge trimmer
- rototillers
- mortar mixer
- mulcher
- paddle broom
- pallet jack
- pneumatic hammer
- post hole auger
- post pounder
- soil screener
- tree spade
- trencher
- trimmers
- walk-behinds (various)
- chipper
- clearing saw
- flat filler
- lifts
- mortar mixer
- paddle broom
- pallet jack
- peat shredder
- pneumatic hammer
- post hole auger
- post pounder
- pot filler
- potting machines
- pumps
- steam cleaner
- tree gantry
- trencher
- vehicles with blades
- walk-behinds (various)
- snowblower

Equipment Attachments

Common

- bucket
- flat deck
- forks
- ladders
- landscape rake
- loaders
- trailer

Level 1

- aerator
- back hoe
- cultivator
- dethatcher
- spreader
- grader
- mower baggers
- mowers
- overseeder
- plough
- rollers
- seeders
- top-dresser
- trencher

Level 2

- aerator
- auger/post hole digger
- cultivator
- spreader
- grapple
- leaf vacuum
- power sweeper
- spray equipment
- trencher
- tree dolly
- tree spade

Level 3

- auger/post hole digger
- blade
- cultivator
- grader
- plough
- power sweeper
- snow equipment
- spray equipment
- trencher
- vacuum

Level 4

- back hoe
- grader

PPE and Safety Equipment

Common

- ear protection
- eye protection
- eye wash kit
- face shields
- fire extinguisher
- first aid kit
- flares
- gloves
- hard hat
- hearing protection
- high visibility clothing
- safety boots
- safety vests
- scabbard/protective sheath
- skin protection
- spill kit
- sun hat
- sunblock
- traffic cones

Level 1

- chemical suit
- fall protection equipment
- respiratory protection

Level 2

- chaps/ballistic pants
- chemical suit
- respiratory protection

Level 3

- chaps/ballistic pants
- chemical suit
- fall protection equipment
- respiratory protection
- ventilation fan

Level 4

- fall protection equipment

Reference Materials

LEVEL ONE

Required Reference Materials

- Kwantlen University College School of Horticulture Plant identification Database, www.kwantlen.ca/horticulture/
  https://appserver1.kwantlen.ca/apps/plantid/plantid.nsf/search
- Botany for Gardeners - Latest edition. Capon, Brian. Timber Press, Portland, OR.
- Soil Science and Management - Latest edition. Plaster J. Edward. Thomson/Delmar Learning, Clifton Park, NY
- British Columbia Landscape Standard - Latest edition. BC Landscape and Nursery Association and the British Columbia Association of Landscape Architects, Surrey, BC
- Landscape Horticulturist Level One Apprentice Manual, by HEBC
  - Identify Plants and Describe Their Use – Module 1, HEBC 2012
  - Communication and Organizational Skills – Module 1, HEBC 2012
  - Equipment Maintenance and Safety – Module 1, HEBC 2012
  - Plant Science for Horticulture – Module 1, HEBC 2012
  - Plant Stress – Signs and Symptoms, HEBC 2012
  - Soil and Soilless Media – Physical and Biological Characteristics – Module 1, HEBC 2012
  - Horticultural Skills – Module 1, HEBC 2012

Recommended Resources and Texts

- Integrated Pest Management Manual for Landscape Pests in British Columbia. Gilkeson, Linda A. 2009. Pollution and Remediation Branch, Victoria, BC.
- WorkSafeBC Website (http://www.worksafebc.com/)
- Equipment Manufacturers Websites (Internet)
- Abiotic Disorders of Landscape Plants : A Diagnostic Guide - Costello, Laurence Raleigh. 2003. University of California, Agriculture and Natural Resources, Oakland, CA
- Home and Garden Pest Management Guide for British Columbia - B.C. Ministry of Agriculture Fisheries and Food Latest edition. Crown Publications, Victoria, BC
- B.C. Nursery and Landscape Pest Management and Production Guide - Latest edition. B.C. Ministry of Environment, Lands, and Parks. Latest Edition, Crown Publications, Victoria BC
- Ball Identification Guide to Greenhouse Pests and Beneficials - Gill, Stanton. 1998. Ball Publishing, Batavia, Ill.
- Field Guide to Noxious and Other Selected Weeds of British Columbia - Cranston, Roy. 2002. Ministry of Agriculture, Food and Fisheries; Ministry of Forests, Victoria, BC (Also available online at http://www.agf.gov.bc.ca/cropprot/weedguid/weedguid.htm)
- Pacific Northwest; Plant Disease Management Handbook - 2000. Extension Services of Oregon State University, Washington State University, and the University of Idaho
- Soil Management Handbook for the Lower Fraser Valley - Bertrand, R.A., G.A. Hughes-Games, and D.C. Nikkel. 1991. Ministry of Agriculture, Fisheries & Food, Abbotsford, B.C.
- Western Fertilizer Handbook - Soil Improvement Committee, California Fertilizer Association. Latest edition (Horticulture ed.) Interstate Publishing Inc., Danville, Illinois

- Groundskeepers Safety Guide - Latest edition. Canadian Centre for Occupational Health and Safety, Hamilton, ON.
- Outdoor Power Equipment, Latest Edition, Webster, Jay, Nelson. Canada, Scarborough ON

NOTE:

This list of Reference Materials is for training providers. Apprentices should contact their preferred training provider for a list of recommended or required texts for this program.

LEVEL TWO

Required Reference Materials

- Kwantlen University College School of Horticulture Plant identification Database, www.kwantlen.ca/horticulture/
- https://plantdatabase.kwantlen.ca
- Botany for Gardeners - Capon, Brian. Latest edition. Timber Press, Portland, OR.
- Integrated pest management manual for landscape pests in British Columbia - Gilkeson, Linda A. 2000. Pollution and Remediation Branch, Victoria, BC.
- Soil Science and Management - Latest edition. Plaster J. Edward. Thomson/Delmar Learning, Clifton Park, NY
- British Columbia Landscape Standard - Latest edition. BC Landscape and Nursery Association, BC Society of Landscape Architects, BC
- Canadian Standards for Nursery Stock - Latest edition. Canadian Nursery and Landscape Association
- Landscape Horticulturist Level Two Apprentice Manual, by HEBC
  - Identify Plants and Describe Their Use – Module 2, HEBC 2012
  - Leadership and Organizational Skills – Module 2, HEBC 2012
  - Equipment Maintenance and Safety – Module 2, HEBC 2012
  - Plant Science for Horticulture – Module 2, HEBC 2012
  - Plant Stress – Causes and Controls – Module 2, HEBC 2012
  - Soils and Soilless Media – Chemical Characteristics – Module 2, HEBC 2012
  - Horticultural Skills – Plant Quality and Handling – Module 2, HEBC 2012

Recommended Resources and Texts

- Kwantlen University College School of Horticulture Plant identification Database, www.kwantlen.ca/horticulture/
- https://plantdatabase.kwantlen.ca
- Field Guide to Noxious and Other Selected Weeds of British Columbia - Cranston, Roy. 2002. Ministry of Agriculture, Food and Fisheries; Ministry of Forests, Victoria, BC (Also available online at http://www.agf.gov.bc.ca/cropprot/weedguid/weedguid.htm)
- WorkSafeBC Website (http://www.worksafebc.com/)
- Equipment Manufacturers Websites (Internet)
- B.C. Nursery and Landscape Pest Management and Production Guide - Latest edition. B.C. Ministry of Environment, Lands, and Parks. Latest Edition, Crown Publications, Victoria BC
- Home and Garden Pest Management Guide for British Columbia - B.C. Ministry of Agriculture Fisheries and Food Latest edition. Crown Publications, Victoria, BC
- Abiotic disorders of landscape plants: a diagnostic guide - Costello, Laurence Raleigh. 2003. University of California, Agriculture and Natural Resources, Oakland, CA
- Ball Identification Guide to Greenhouse Pests and Beneficials - Gill, Stanton. 1998. Ball Publishing, Batavia, Ill.
- Pacific Northwest; Plant Disease Management Handbook - 2008. Extension Services of Oregon State University, Washington State University, and the University of Idaho
- Handbook for Pesticide Applicators and Pesticide Dispensers - Latest edition. Provincial Ministry of Environment, BC
- Western Fertilizer Handbook - Soil Improvement Committee, California Fertilizer Association. Latest edition. (Horticulture Ed.) Interstate Publishing Inc., Danville, Illinois

- Soil Fertility Manual - Latest edition. Potash & Phosphate Institute and the Foundation for Agronomic Research. Province of British Columbia Ministry of Skills, Training and Labour and the Centre for Curriculum and Professional Development, Norcross, GA
- Considerations for their use - Ministry of Education, Skills and Training and the Ministry of Labour and the Centre for Curriculum and Professional Development. 1995. BC.
- Outdoor Power Equipment, Latest Edition, Webster, Jay, Nelson. Canada, Scarborough ON

NOTE:

This list of Reference Materials is for training providers. Apprentices should contact their preferred training provider for a list of recommended or required texts for this program.

LEVEL THREE

Required Reference Materials

- Landscape Horticulturist Level Three Apprentice Manual, by HEBC
- Kwantlen University College School of Horticulture Plant identification Database, www.kwantlen.ca/horticulture/
- https://plantdatabase.kwantlen.ca
- B.C. Nursery and Landscape Pest Management and Production Guide - Latest edition. B.C. Ministry of Environment, Lands, and Parks. Latest Edition, Crown Publications, Victoria, BC
- Home and Garden Pest Management Guide for British Columbia - B.C. Ministry of Agriculture Fisheries and Food Latest edition. Crown Publications, Victoria, BC.
- Integrated pest management manual for landscape pests in British Columbia - Gilkeson, Linda A. 2000. Pollution and Remediation Branch, Victoria, BC. (Also available online at http://wlapwww.gov.bc.ca/epd/epdpa/ipmp/ipm-manuals.htm).
- Arboriculture: Integrated Management of Landscape Trees, Shrubs, and Vines - Harris, R., J. Clark, and N. Matheny. Latest edition. Prentice Hall Upper Saddle River, New Jersey,
- British Columbia Landscape Standard - Latest edition. BCLNA/BCSLA, Surrey B.C.
- Soil Science and Management - Latest edition. Plaster, E. J. Delmar Publishing. Albany, NY
- Irrigation System Design Binder - Hunter Industries. San Marcos, CA.
- A Guide to Troubleshooting Automatic Sprinkler Systems - The Toro Company. Riverside, CA.
- Low-Volume Landscape Irrigation Design Manual - Rain Bird Corporation. Glendora, CA.
- Principles of Exterior Drainage - NDS, Inc. Lindsay, CA.
- Landscape Construction - Latest edition. Sauter, David. Delmar Thomson Learning, Albany, NY

Recommended Resources and Texts

- Protecting Nature's Balance: IPM in B.C. - U.B.C. Access. (Video)
- IPM Training Manual for Landscape Gardeners - Daar Sheila, Helga Olkowski and William Oldowski. 1992. The Bio-Integral Resource Centre (BIRC), Berkley, CA
- IPM for Floriculture and Nurseries - Latest edition. Dreistadt, Steve (editor) University of California, Oakland CA Publication 3402
- Pests of Landscape Trees and Shrubs - Latest edition. Dreistadt, Steve (editor). University of California Oakland CA. Publication 3359.
- A Colour Handbook of Biological Control in Plant Protection - Latest edition. Helyer, N. et al. Timber Press, Portland, OR
- Knowing and Recognizing the Biology of Glasshouse Pests and Their Natural Enemies - Latest edition. Malais, M.H. and Ravensberg, W.J. Koppert
- Biological Systems - Reed Business Information, Doetinchem, Netherlands
- Applied Bionomics Biological Technical Manual - Latest edition. Matteoni, J.A. and Elliot, D. Applied Bionomics, Sidney, B.C.
- Concepts in Integrated Pest Management - Latest edition. Norris, R.F., et al. Prentice Hall. Upper Saddle River, NJ
- Common Sense Pest Control - Latest edition. Olkowski, W. et al. Taunton Press, Newtown, CT
- Pest Management Recommendations for Greenhouse Crops - Ontario Ministry of Agriculture Latest edition. Publication 365, Ontario MAF
- Nursery and Landscape Plant Production and IPM Publication 383 - Ontario Ministry of Agriculture. Latest edition. Ontario MAF

- Entomology and Pest Management - Latest edition. Pedigo, L. P. Prentice Hall, Upper Saddle River, NJ
- Arborists' Certification Study Guide - Latest edition. International Society of Arboriculture, Champaign Ill.
- Cavendish Encyclopedia of Pruning and Training - Brickell, C. 1996. Cavendish Books, Vancouver, B.C.
- An Illustrated Guide to Pruning - Latest edition. Gilman, Edward F. Delmar-Thomson Learning, NY.
- Soil Improvement Committee of the California Fertilizer Association. Western Fertilizer Handbook, Horticulture Edition. Latest edition. Interstate Publishers, Danville IL
- Simplified Irrigation Design - Melby, Pete. 1995. Van Nostrand Reinhold
- Irrigation System Design – an Engineering Approach - Cuenca, Richard H. 1989. Prentice-Hall, New York
- Drip Irrigation: For Every Landscape and All Climates - Kourik, Robert. 1992. Metamorphic Press, Santa Rosa, CA
- Course and Grounds Irrigation and Drainage - Jarrett, Albert R. Golf. 1985. Prentice-Hall, Reston, VA
- Golf Course Irrigation System Design - Pira, Edward S. 1998. Ann Arbor Press, Ann Arbor, MI
- Course and Grounds Irrigation and Drainage - Jarrett, Albert R. Golf. 1985. Prentice-Hall, Reston, VA
- Golf Course Irrigation System Design - Pira, Edward S. 1998. Ann Arbor Press, Ann Arbor, MI
- Turf Irrigation Manual - Choate, Richard B. 1994. Weathermatic Publishing, Dallas, TX

NOTE:

This list of Reference Materials is for training providers. Apprentices should contact their preferred training provider for a list of recommended or required texts for this program.

LEVEL FOUR

Required Reference Materials

- Landscape Horticulturist Level Four Apprentice Manual, by HEBC
- Kwantlen University College School of Horticulture Plant identification Database, www.kwantlen.ca/horticulture/
- https://plantdatabase.kwantlen.ca
- BC Nursery and Landscape Pest Management and Production Guide - Latest edition. B.C. Ministry of Environment, Lands, and Parks. Latest Edition, Crown Publications, Victoria BC
- Home and Garden Pest Management Guide for British Columbia - B.C. Ministry of Agriculture Fisheries and Food Latest edition. Crown Publications, Victoria, BC
- Integrated pest management manual for landscape pests in British Columbia - Gilkeson, Linda A. 2000. Pollution and Remediation Branch, Victoria, BC.
- Arboriculture: Integrated Management of Landscape Trees, Shrubs and Vines. - Latest edition. Harris, Richard W., James R. Clark, Nelda P. Metheny. Prentice Hall, NJ
- British Columbia Landscape Standard - Latest edition. BC Landscape and Nursery Association and the British Columbia Association of Landscape Architects, Surrey, BC

Recommended Resources and Texts

- The Turf Line News - Western Canada Turfgrass Association, BC.
- Protecting Nature's Balance: IPM in B.C. - U.B.C. Access. (Video)
- IPM Training Manual for Landscape Gardeners - Daar Sheila, Helga Olkowski and William Oldowski. 1992. The Bio-Integral Resource Centre (BIRC), Berkley, CA
- IPM for Floriculture and Nurseries - Latest edition. Dreistadt, Steve (editor) University of California, Oakland CA Publication 3402
- Pests of Landscape Trees and Shrubs - Latest edition. Dreistadt, Steve (editor). University of California Oakland CA. Publication 3359
- A Colour Handbook of Biological Control in Plant Protection - Latest edition. Helyer, N. et al. Timber Press, Portland, OR
- Knowing and Recognizing - Latest edition. Malais, M.H. and Ravensberg, W.J. Koppert
- Biological Systems - Reed Business Information, Doetinchem, Netherlands
- Applied Bionomics Biological Technical Manual - Latest edition. Matteoni, J.A. and Elliot, D. Applied Bionomics, Sydney, B.C.
- Concepts in Integrated Pest Management - Latest edition. Norris, R.F., et al. Prentice Hall, Upper Saddle River, NJ
- Common Sense Pest Control - Latest edition. Olkowski, W. et al. Taunton Press, Newtown, CT
- Pest Management Recommendations for Greenhouse Crops - Latest edition. Ontario Ministry of Agriculture Publication 365, Ontario MAF
- Nursery and Landscape Plant Production and IPM Publication 383 - Latest edition. Ontario Ministry of Agriculture. Ontario MAF
- Entomology and Pest Management - Latest edition. Pedigo, L. P. Prentice Hall, Upper Saddle River, NJ
- Residential Landscape Architecture - 2nd edition. Booth, N. K. & Hiss, J.H. 1999. Prentice-Hall Publishing, Upper Saddle River, NJ
- Landscape Design: A Practical Approach 4th edition - Hannebaum, L.G. 1998. Prentice-Hall Publishing, Upper Saddle River, NJ
- Turfgrass Management - 6th edition. Turgeon, A. J. 2002. Prentice-Hall Publishing, Upper Saddle River, NJ

- Fundamentals of Turfgrass Management - Christians, Nick. 1998. Ann Arbor Press, Chelsea MI
- Turfgrass Science and Management 3rd edition - Emmons, R. 1999. IPT, Delmar. Albany NY
- Turf Irrigation Manual - Choate, Richard B. 1994. Weathermatic Publishing, Dallas, TX
- Turfgrass Management - Turgeon, A. J. 2002. 6th edition. Prentice-Hall Publishing, Upper Saddle River, NJ
- Fundamentals of Turfgrass Management - Christians, Nick. 1998. Ann Arbor Press, Chelsea MI

NOTE:

This list of Reference Materials is for training providers. Apprentices should contact their preferred training provider for a list of recommended or required texts for this program.

Instructor Requirements

Occupation Qualification

The instructor must possess:

- Subject matter competence as demonstrated by a Landscape Horticulturist Trade Qualification/Apprentice Certificate, Horticulture Diploma or Degree
- Adult teaching competence as demonstrated by successful completion of Provincial Instructor Diploma (PIDP) or equivalent or regular faculty status at an institution which has a defined faculty review process (as specified by institutional policy) or contract faculty who have at least completed the Instructional Skills Workshop (PIDP 3102) or equivalent.

Work Experience

A minimum three (3) years of experience working in the industry related to the specific area of competency, unless specified below.

ADDITIONAL CREDENTIALS AND EXPERIENCE RECOMMENDED FOR SPECIFIC SUBJECT MATTER

Line A PERFORM SAFETY-RELATED FUNCTIONS

- Subject matter competence as demonstrated by an Outdoor Power Equipment Trades Qualification/Apprentice Certificate or as demonstrated by a Landscape Horticulturist Qualification/Apprentice Certificate or Horticulture Diploma, Certified Landscape Professional and five years of industry experience.

Line B USE TOOLS, EQUIPMENT AND VEHICLES

- Subject matter competence as demonstrated by an Outdoor Power Equipment Trades Qualification/Apprentice Certificate or as demonstrated by a Landscape Horticulturist Qualification/Apprentice Certificate or Horticulture Diploma, and five years of industry experience. Class 5 Driver's License.

Line C ORGANIZE WORK

- Subject matter competence as demonstrated by a Landscape Horticulturist Qualification/Apprentice Certificate or Horticulture Diploma, Certified Landscape Professional, Project Management Certificate and five years of industry experience.

Line D PARTICIPATE IN MARKETING AND SALES

- Subject matter competence as demonstrated by a Horticulture Trades Qualification/Apprentice Certificate or Horticulture Diploma, Certified Landscape Professional, Diploma with Marketing, Human Resource or Organizational Behaviour specialty or Baccalaureate Degree in Business. Two years supervisory or management experience in a private or public organization.

D4 Prepare Estimates

- Subject matter competence as demonstrated by a Landscape Horticulturist Qualification/Apprentice Certificate or Horticulture Diploma, Certified Landscape Professional, or Certificate or Diploma in Project Management. Three years of industry experience as a landscape or construction estimator.

Line E USE COMMUNICATION AND MENTORING TECHNIQUES

- Subject matter competence as demonstrated by a Landscape Horticulturist Qualification/Apprentice Certificate or Horticulture Diploma, Certified Landscape Professional Business, or Diploma with Human Resource or Organizational Behaviour specialty or Baccalaureate Degree in Horticulture with a minor in Business or Certified Landscape Professional. Two years supervisory or management experience in a private or public organization.

Line F APPLY HORTICULTURAL PRACTICES

F1 Practice Basic Plant Science

- Subject matter competence as demonstrated by a Baccalaureate Degree in Horticulture, Botany, Agronomy, Plant Biology, Forestry, or Crop Science and/or a Diploma in Horticulture, Agriculture or Forestry with a minimum of 5 years of experience in plant science.

F2 Identify Plants and Plant Requirements

- Subject matter competence as demonstrated by a Landscape Horticulturist Qualification/Apprentice Certificate or Horticulture Diploma or Baccalaureate Degree in Horticulture, Botany, Agronomy, Plant Biology, Forestry, or Crop Science. Minimum 5 years of experience in horticulture.

F3 Manage Plant Health and Growing Conditions

- Subject matter competence as demonstrated by a Horticulture Diploma or Baccalaureate Degree in Horticulture, Agronomy, Forestry, Crop Science, or Pest Management and/or a Diploma in Agriculture or Forestry with a minimum of 5 years of experience in analyzing and maintaining plant health.

F4 Prune Plant Material

- Subject matter competence as demonstrated by Landscape Horticulturist or Arboriculture Qualification/Apprentice Certificate, Horticulture Diploma. International Society of Arboriculture – Arborist Certification. 5 years of experience.

Line G APPLY ENVIRONMENTAL PRACTICES

- Subject matter competence as demonstrated by a Landscape Horticulturist Qualification/Apprentice Certificate or Horticulture Diploma or Baccalaureate Degree in Horticulture, Botany, Agronomy, Plant Biology, Forestry, or Crop Science. Minimum 5 years of experience in horticulture.

G3 Practice Soil Stewardship

- Subject matter competence as demonstrated by a Baccalaureate Degree in Soil Science Horticulture, Agronomy, Forestry, or Crop Science and/or a Diploma in Horticulture, Agriculture or Pest Management with a minimum of 5 years of experience in analyzing physical and biological characteristics of soil and soilless media.

Line H PERFORM PRE-CONSTRUCTION ACTIVITIES

- Subject matter competence as demonstrated by a Landscape Horticulturist Qualification/Apprentice Certificate or Horticulture Diploma, Certified Landscape Professional, Project Management Certificate and five years industry experience. Five years of experience.

H1 Participate in Landscape Design Activities

- Subject matter competence as demonstrated by a Horticulture Diploma (Landscape Design) or CNLA Certified Landscape Designer or Bachelor of Landscape Architecture, plus 2 years of experience in private or public organization developing and implementing landscape designs.

Line I INSTALL HARDSCAPE

- Subject matter competence as demonstrated by a Horticulture, Carpentry or Masonry Trades Qualification/Apprentice Certificate or Horticulture Diploma, plus five years of relevant industry experience.

I4 Install Irrigation Systems

- Subject matter competence as demonstrated by a Landscape Horticulturist Qualification/Apprentice Certificate or Horticulture Diploma and BC Certified Irrigation Technician Level One.

Line J INSTALL SOFTSCAPE

- Subject matter competence as demonstrated by a Landscape Horticulturist Qualification/Apprentice Certificate or Horticulture Diploma or Baccalaureate Degree in Horticulture and 2 years of practical landscape experience.

Line K INSTALL GREEN INFRASTRUCTURE SYSTEMS

- Subject matter competence as demonstrated by a Horticulture Diploma or Baccalaureate Degree in Horticulture or Environmental Sciences and one year of practical experience designing or maintaining green infrastructure.

Line L MAINTAIN HARDSCAPE

- Subject matter competence as demonstrated by a Horticulture, Carpentry or Masonry Trades Qualification/Apprentice Certificate or Horticulture Diploma, plus two years of experience.

Line M MAINTAIN SOFTSCAPE

- Subject matter competence as demonstrated by a Horticulture Trades Qualification/Apprentice Certificate or Horticulture Diploma and five years of practical landscape experience.

Line N MAINTAIN GREEN INFRASTRUCTURE

- Subject matter competence as demonstrated by a Landscape Horticulturist Qualification/Apprentice Certificate or Horticulture Diploma or Baccalaureate Degree in Horticulture or Environmental Sciences and one year of practical experience designing or maintaining green infrastructure.

Appendices

Appendix A
Previous Contributors

The Program Outline was prepared with the advice and direction of an industry steering committee convened initially by the HortEducationBC (HEBC). Members included:

- Anne Kadwell — CEO HortEducationBC
- Bill Hardy — HEBC Board Chair (Northwest Landscape Ltd.)
- Don Fraser — Past Chair (Northwest Landscape Ltd.)
- Mary Ann Van Den Berge — BCLNA Representative (Trice Farms Pond & Garden Centre)
- Cable Baker — BCLNA Representative (RCB Garden Service)
- Bruce McTavish — BCLNA Representative (Kwantlen Polytechnic University, McTavish Resource & Management Consultants Ltd.)
- Garfield Marshall — BCLNA Representative (Advance Orchard Co. Ltd.)
- Ted de Crom — WCTA Representative (City of Richmond Parks & Recreation Department)
- Gail Szostek — GreenSpace Consulting (former HortEducation BC Board Member)
- Bill Reid — the Corporation of the District of Powell River, Department of Parks, Recreation and Culture (former HortEducation BC Board Member)
- Egan Davis — HortEducationBC Board Member (City of Vancouver)
- Rob Welsh — Education Representative (Kwantlen Polytechnic University)
- Dale Toronitz — Education Representative (Camosun College)
- Denis Gour — Apprentice Representative (Blasig Landscape Design & Construction Ltd.)

Industry Subject Matter Experts retained to assist in the development of the Program Outline (2013):

- Carol Barnett
- PJ Burns
- Betty Cunnin
- David Davidson
- Jeff Foley
- Renee Giardini
- Denis Gour

- Tim Holt
- Peter Isaacson
- Gary Jones
- Anne Kadwell
- Ron Marchuk
- Bruce McTavish
- Michelle Nakano
- Dan Regan
- Kristine Schlamp
- Liz Spring