



## JOB DEMANDS ANALYSIS

**Company:** City of Burnaby

**Location:** Works Yard

**Job Title:** Labourer – Parks Maintenance

**Classification:** Regular Duty

### Purpose of Activities

The Labourer is responsible for the repair and regular maintenance of parks, sports fields, playgrounds and trails in the city of Burnaby. These tasks include litter pick-up; equipment repair, maintenance, installation and removal; trail and sign maintenance; floating and screening ball diamonds and soccer fields, installing pitchers mounds; bleacher and bench repair; barrier and sign installation, minor landscaping; outdoor pool cleaning and snow removal.

### Tools and Equipment

The Labourer will use the following tools and equipment to perform their duties:

- Ford one ton Super Duty Truck with dump box (usually one Labourer is assigned)
- One ton Gruman van (two to four assigned depending on season)
- Hand tools – shovels, fan rake, rake, potato hook, push broom, corn broom, handsaws, level, hammers, sledge hammers, claw hammer, rubber mallet, loppers, picks, pry bars, bolt cutters, axe, pitch forks, tape measures, files, rat tail file, hack saw, utility knife, wrenches, pliers, screw drivers, sockets, vise grips, cutters, scrapers, pipe cutters, pipe wrenches, reflective tape, chains, rope, sponges, buckets, edgers, bungee straps, leather gloves, latex gloves, ear plugs, dust masks, eight-foot extension ladder, step ladder, clamps, wire cutters, wheelbarrow, flash light, work belts, pouches, spray paint, paint wheel, pogo and bucket
- Power tools- chain saws and safety gear, weed eaters, backpack blower, drills, circular saw, lawn mower, push blower, jackhammer
- Nuts, bolts, nails, screws, washers, fencing ties
- First Aid kit and Sharps container
- Traffic control – stop signs, traffic cones
- Oil/gas mix, gas in jerry cans
- Steel toe work boots, safety vest, hard hat, ear plugs, safety glasses, visors

### Usual Methods

1. Drive to work site location.
2. Set up traffic control if required.
3. Unload necessary tools and equipment to perform job tasks.
4. Perform job tasks.
5. Clean up work site.
6. Load tools, equipment and traffic control back into one-ton truck and/or Gruman van.



7. Drive to next location.
8. Repeat steps 1-7.

### **Litter Pick-up**

Monday and Friday, the Labourer, will pick litter from parks and sports field. Typically, a Pogo and 20-litre pail are used. The Labourer will walk the park or sports field and pick the litter and place it in his pail. The pail is dumped as it becomes full and the task is continued until the park or sports field has been cleared. Litter pick-up may also be performed when a repair or maintenance task takes a crew to a park, sports field, trail, etc. and only requires one or two Labourers. The other Labourers will pick litter. A backpack blower is also used to clean grass, rocks leaves, etc. from sidewalks and path. In the fall, leaves are raked, bagged and taken for composting.

### **Screen and Float Sports Fields**

On Monday and Friday the Labourer who is assigned to the one-ton truck will hook the chain of the screen and float on the back of the truck. The truck is driven around the infield of the sports field. Each sports field has its own screen and float. The second Labourer will pick litter.

### **Turfing (June/July)**

During these months, the Parks Maintenance Crews will replace damaged or worn turf on sports field.

### **Parks/Trail/Sports Field Maintenance and Repair**

Maintenance and repair is a year round task that can include but is not limited to: performing regular walk through checks; repairing broken or damaged equipment; installing new or seasonal signs, removing or installing goal posts, tennis nets; cutting and removing brush from trails; playground maintenance and repair, installation and removal of pitching mounds; installation of barriers and gates; fence repairs; pressure wash tennis courts and outdoor swimming and wading pools, repair trail washouts trail beds, tree limb removal etc.

### **Snow Removal**

In the winter, the Parks Maintenance Crew will shovel snow from recreation centres in their quadrant of the city.

### **Furniture Moving\*\***

On occasion, the Parks Maintenance Crew is required to assist with some furniture moving at recreation centres within their quadrant of the city.

### **One-ton Truck with Dump Box**

This truck is used to pick up and deliver debris and material at the work sites in the Parks Maintenance Crews quadrant of the city.



**The presence of \*\* indicates non-value added tasks. These tasks do not contribute to the stated purpose of the work.**

#### Administrative Issues

The Labourer works from Monday to Friday 0700 to 1530 with a ten-minute rest period in the morning, a 30-minute lunch break and a ten-minute rest period in the afternoon. Overtime and on-call are not required of this position. The Labourer works in all weather conditions. This position may be classified as full-time permanent or Seasonal (April to November). Seasonal Labourers are laid off some time in November. The Labourer estimate that the busiest time of year are the spring and summer months from April to November. The Parks Maintenance Crews usually consist of two to four Labourers on the Gruman van and one Labourer and a Truck Driver I on the one-ton truck with a dump box. There is one Parks Maintenance Crew located in each quadrant (north, south, east and west) of the city of Burnaby. However, some parks and/or sports fields have a permanent Labourer permanently assigned to them.

#### Activity Demand Variables

These variables are tasks that must be carried out by the employee and are implicitly or explicitly required as objectives of the job.

- Shovel, pitch fork dirt and debris to back of one-ton truck
- Lift, carry, throw or place dirt, tree limbs, tree rounds and debris from a shovel or pitchfork from ground level to the one-ton truck (one to one and a half metres high)
- Lift, carry, hold and operate hand and power tools (one to 41-kg) from below ground (dig hole) to above shoulders (use chain saw, hand saws, branch cutters etc)
- Litter pick-up in parks and sports fields on Monday and Friday
- Screen and float sports fields on Monday and Friday
- Walk from Gruman van/one-ton truck to work location, in and around parks, trails, sports fields, etc. (less than 10 metres to several kilometres depending on the task)
- Stand at work site on grass, dirt, rock, asphalt, concrete
- Bend, stoop, kneel, crawl to perform labouring tasks for regular maintenance and repair
- Work in all weather conditions including prolonged periods of rain or heat

#### Worker Decision Variables

These variables are the sub-routines and cognitive/physical decisions made by the worker in carrying out the objectives of the job.

- Rotate tool (hand and power) use with other crew members to aid in recovery from prolonged activity
- Lifting technique for most tasks

#### Accommodative Considerations

1. People with injuries to the spine, in any region, may have difficulty with the static and dynamic movements required in this position.



2. People with shoulder injuries such as rotator cuff tendonitis, bursitis and instability may have difficulty with dynamic and static loading and reaching activities required in this position.
3. People with forearm and elbow injuries such as tennis elbow may have difficulty with the static grip forces required during any power or hand (especially Pogo use for litter pick-up) tool use.
4. People with nerve compression injuries in the upper extremities may have difficulty with the repeated and prolonged use of hand (Pogo for litter pick-up) and power tools (compression and vibration) below, at and above shoulder height.
5. People with lower extremity injuries to the hips, knees and ankles will have difficulty maintaining the required pace and covering the expected distances during litter pick-up and the regular maintenance and repair in the parks, sports fields, playgrounds, trails, etc.

Prepared By: Jeffrey J. McGinn, Kinesiologist

May 20, 1999



## Summary of Stresses

### Metabolic Stresses

The aerobic energy system will supply the major source of energy while performing the duties and responsibilities of the Labourer. This energy system will be utilized during park, sports field, playground and trail maintenance and repair as well as the other unrelated duties of this position. The anaerobic energy systems may be required to supply energy for brief intense periods of work, which may include heavy or sustained digging, lifting or carrying; or towards the end of the day when the aerobic energy system has been depleted. In this last instance, the anaerobic energy system becomes the primary energy source

### Structural Stresses

**Spine** – Typically, flexion, extension, lateral flexion and rotation movements will be performed while the Labourer is handling a load (hand or power tools, debris, 1-50 kg). Forward flexed postures during hand and power tool use require no activity from the torso musculature, but increase asymmetrical disc compression and passive stretch on the posterior spinal ligaments and disc fibres. This can contribute to disc integrity problems as well as decondition the torso support musculature. Lateral flexion and/or rotation with or without forward flexion (loaded or unloaded) will significantly increase the shear forces encountered by the discs, fibres and spinal ligaments.

**Neck, Shoulders and Upper Extremity**– This position requires prolonged and repeated static and dynamic movements from below to above shoulder height. The static and dynamic movements through the shoulder and upper extremity often require the rotator cuff muscle groups, upper trapezius and scalene muscles of the neck to maintain a constant and significant load. Hand and power tool use (predominately both hands) will increase the static and dynamic loading of the forearm flexors, extensors, supinator, pronator teres and the pronator quadratus. Chain saw, weed eater and other power tools will increase the vibration and compressive forces from the grip to the elbow and shoulder that may lead to over use tendon or nerve injuries. Impingement and inflammatory injuries to the shoulders are likely due to the prolonged static arm position (flexed and abducted shoulder and elbow) required during some work.

Almost all of the Labourer's work is carried out in front of his body with some type of tool or implement. This position will weaken the shoulder girdle support structure and increase the risk of injury to this area. Rotator cuff and biceps tendon tendonitis injuries are likely as the muscle of the upper back and shoulder weaken through prolonged use. As this happens, thoracic spine kyphosis will increase and the cervical spine will be pulled forward out of its neutral position.

**Hips and Lower Extremities** – will be taxed in the many dynamic movements associated with walking, standing, climbing, lifting and carrying on stable and unstable surfaces (grass, gravel, dirt, rock, concrete, asphalt, mud, ladders, truck boxes, etc.). These surfaces may be wet or dry. Twisting an ankle or knee or a slip and fall injury are the most likely to the lower extremities.



**Insect Stings** – stinging insects will increase the risk of injury to the Labourer - Parks Maintenance and may range from localized swelling of the affected area to anaphylactic shock and death.

### **INTERVENTIONS**

Recommendations that could be implemented to increase productivity and lessen the risk of injury are listed below:

1. Encourage the Labourer to maintain an increased level of fitness away from work that will focus on cardiovascular endurance, muscular strength, muscular endurance and flexibility.
2. Provide the Labourer postural awareness training that focus on the importance of proper body posture and how it relates to their ultimate physical comfort and reducing fatigue level.
3. Continue to use mechanical equipment where ever possible to decrease repetitive, long duration tasks required by the Labourer.

PJDC-Labourer Parks Maintenance

Referral: Lana Ho			Organization: City of Burnaby						Title: Parks Maintenance Labourer		
Dept.: Engineering			Division: Parks						Contact: Ron Soroka		
PHYSICAL DEMANDS			R E Q U I R E D	S I D E	FREQUENCY*				Max. Weight (kg)	Usual Weight (kg)	COMMENTS
					Sel 1	Low 2	Mod 3	High 4			
S T R E N G T H	Lifting - Floor to Knuckle	X	B			X		41	<1-5	hand and power tools, material	
	Lifting - Knuckle to Waist	X	B				X	41	<1-5	hand and power tools, material	
	Lifting - Waist to Shoulder	X	B				X	41	<1-5	hand and power tools, material	
	Lifting - Over Head	X	B	X				15	<1-5	hand and power tools, material	
	Carrying - With Handles	X	B				X	41	<1-5	hand and power tools, material	
	Carrying - Without Handles	X	E				X	41	<1-5	hand and power tools, material	
	Pushing - Upper Extremity	X	E				X	15	<1-5	tool use, saws, positioning material	
	Pushing - Hip/Leg Assist	X	E				X	50	<1-5	tool use, saws, positioning material	
	Pulling - Upper Extremity	X	E				X	15	<1-5	tool use, saws, positioning material	
	Pulling - Hip/Leg Assist	X	E				X	50	<1-5	tool use, saws, positioning material	
	Reach - Shoulder or Above	X	B		X			20	<1-5	tool use, positioning material	
	Reach - Sho. or Above extnd	X	B	X				15	<1-5	tool use, positioning material	
	Reach - Below Shoulder	X	B				X	41	<1-5	hand/power tool use, lift, carry, position materials	
	Reach - Bel. Shoulder extnd	X	B		X			41	<1-5	lift and carry tools, equipment, materials	
	Handling	X	E				X	41	<1-5	tools, equipment, materials	
E N E R G Y	Gripping	X	B				X	50	<1-5	tools, equipment, materials	
	Fine Finger Movements	X	D			X		mod	low	operate some tools and equipment	
	Aerobic (percent)	X					75	labouring tasks for parks development and contruction			
	Anaerobic (percent)	X			25			possibly for heavy lift, fatigue at end of day			
	High Energy Expenditure	X			X			some labouring tasks, tool use			
	Low Energy Expenditure	X					X	labouring tasks for parks development and construction			
	Neck - Static Flexion	X					X	labouring tasks, tool use below shoulders			
	Neck - Static Neutral	X					X	stand, walk, sit, work at shoulder level with/without tools			
	Neck - Static Extension	X				X		labour tasks from stand/bend/stoop/kneel/crouch above shoulders			
	Neck - Rotation	X	E			X		construction, renovation work, shoulder checks for equipment			
	Throwing	X				X		dirt/debris from shovel			
	Sitting	X			X			drive to/from work site in Gruman van or one ton truck			
	Standing	X					X	at work site on dirt, grass, shale, gravel, asphalt, concrete			
	Walking	X					X	at work site to/from truck/van & work, <10-200 metres or more			
	P O S T U R E S	Running/Jumping									
Climbing - Arms and Legs		X		X				into back of one ton truck, ladder			
Climbing - Legs Only		X			X			into back of Gruman van, hills, trails			
Bending/Stooping		X					X	labouring tasks, shovel, tool use, lift, carry			
Crouching		X				X		labouring tasks, tool use			
Kneeling		X			X			labouring tasks, tool use			
Crawling		X		X				install benches, patio stones, finish cement			
Twisting		X	E				X	labouring tasks, shovel, rake, tool and equipment use			
Balancing		X			X			on back of truck, over work, on ladder			
Traveling		X			X			to work site in city of Burnaby			
Work Alone								in a crew office, may perform some tasks alone			
Interact with Public		X			X			in parks and on trails			
Operate Equip/Machinery		X				X		hand and power tools, jackhammer, chain saw, etc.			
Irregular/Extended Hours								0700-1530, Monday - Friday, permanent and seasonal work			
* Frequency Legend      1 = Seldom; Not Daily    2 = Low Daily Activity; < 1hr 3 = Moderate Demand; Repetition 1 - 3 hrs daily      4 = High Frequency Demand; Repetition > 3 hrs daily The following shading denotes a      HIGH RISK TASK:      Modifications should be considered											

**REQD** is marked with an X if the particular demand or category is relevant to the purpose of the job.

**SIDE** refers to the side or limb required to execute a task. If it is marked **E**, it indicates either side, the most common choice is listed first. **D** refers to dominant and **B** to both sides.

Referral:		Organization:						Title: see 1st page header	
Dept.:		Division:						Contact:	
PHYSICAL DEMANDS		R E Q D	S I D E	FREQUENCY*				COMMENTS	
				Sel. 1	Low 2	Mod. 3	High 4		
PERCEPTION	Hearing - Conversations	X				X		co-workers, foreman, contractors, public	
	Hearing - Other Sounds	X					X	trucks, equipment	
	Vision - Far	X					X	labouring tasks	
	Vision - Near								
	Vision - Colour	X		X				dye tablets for checking drainage in ditches	
	Vision - Depth	X					X	labouring tasks, working around trucks/equipment	
	Perception - Spatial	X					X	labouring tasks, working around trucks/equipment	
	Perception - Form	X			X			some tool differentiation required	
	Feeling (Tactile)	X				X		force application in hand/power tool use, positioning material	
	Reading	X		X				blue prints, drawings	
WORKING CONDITIONS	Writing								
	Speech	X				X		co-workers, foreman, contractors, public	
	Inside Work	X		X				in City of Burnaby rental houses, buildings	
	Outside Work	X					X	parks construction renovation	
	Hot Conditions >25 deg. C	X		X				spring, summer, fall	
	Cold Conditions <10 deg.C	X		X				fall, winter, spring	
	Humid	X		X				during rain or hot weather	
	Dust	X		X				possibly at some work sites	
	Vapor Fumes	X				X		diesel engines on truck, equipment, oil/gas mix for some equip.	
	Hazardous Machines	X					X	around trucks, equipment, hand or power tool use	
	Proximity to Moving Object	X					X	working around trucks and equipment	
	Noise	X					X	trucks, equipment, power tools	
	Electrical Hazard	X		X				overhead power lines when working with trucks and equipment	
	Sharp Tools	X					X	shovels, loppers, utility knife, chain saw, drill, hand saw	
	Radiant/Thermal Energy	X		X				sun, fertilizer, heat from engines or exhaust	
	Slippery Conditions	X		X				wet grass, dirt, gravel	
	Vibration and Related	X		X				jack hammer, chain saw, other power tools	
	Chemical Irritants	X		X				hard/fast concrete mix, pipedope, PVC glue, fertilizer	
	Organic Substances	X		X				decaying vegetation, dog feces	
	Medical Waste	X		X				discarded needles, condoms	
	Blood Products								
	Congested Worksite	X		X				depends on location and tasks	
	Lighting - Direct	X					X	day light, sun light, overhead lights in buildings	
	Lighting - Indirect	X					X	day light, sun light, overhead lights in buildings	
	Lighting - Adjustable								
	Lighting - Fluorescent	X		X				lights in buildings	
Lighting - Incandescent	X		X				lights in homes		
Lighting - Shadows etc.	X		X				depends on time of day and location		

\* Frequency Legend      1 = Seldom; Not Daily    2 = Low Daily Activity; < 1hr  
3 = Moderate Demand; Repetition 1 - 3 hrs daily      4 = High Frequency Demand; Repetition > 3 hrs daily

The following shading denotes a      HIGH RISK TASK:      Modifications should be considered

**REQD** is marked with an X if the particular demand or category is relevant to the purpose of the job.

**SIDE** refers to the side or limb required to execute a task. If it is marked **E**, it indicates either side, the most common choice is listed first. **D** refers to dominant and **B** to both sides.

For detailed descriptions of each of the different categories, please refer to the reference guide or inquire with Human Effort at 1-888-4EFFORT