

# Training Manual Golf Cart Preventive Maintenance

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## **Purpose**

The purpose of this training manual is:

- to train you in the knowledge, skills, and techniques necessary to properly maintain the Club's golf cart fleet;
- · to teach you how to document golf cart servicing and lubrication; and
- to establish procedures to track and monitor repairs to golf carts.



## Responsibilities

It is the responsibility of the Head Golf Professional to ensure that all preventive maintenance is performed according to schedule. Further, it is his responsibility to ensure that cart attendants are properly trained to perform routine preventive maintenance checks and servicing according to schedule.

It is the Facility Manager's responsibility to:

- monitor the performance of routine preventive maintenance,
- assist the Head Golf Professional in establishing and maintaining the Golf Cart Preventive Maintenance Program, and
- provide expert assistance and advice to the Head Golf Professional and cart attendants in dealing with specific maintenance and repair problems with golf carts.

It is the cart attendants' responsibility to conscientiously perform all specified checks and services called for in the Golf Cart Preventive Maintenance Program and to report problems to the Head Golf Professional in a timely manner.



## Golf Cart Preventive Maintenance and Repair Program

The Club has 72 battery-powered golf carts for use by its members. In addition, the Club has a number of gas-powered utility carts used in support of operations. These carts represent a large investment on the part of the Club.

The useful life of golf carts can be maintained and even extended by proper preventive maintenance.

Inoperative or unserviceable golf carts must be repaired in a timely manner.

#### Golf Cart Preventive Maintenance Program

The Golf Cart Preventive Maintenance Program is a comprehensive series of checks and services to properly maintain golf carts in good working order.

The program entails six basic components:

- Battery Care
- Battery Charging
- Pre-Operation Safety Check
- Periodic Service Schedule
- Periodic Lubrication Schedule
- Golf Cart Cleaning and Detailing



## Golf Cart Preventive Maintenance and Repair Program, Continued

#### Repairs

Golf cars needing repairs will be reported to the Facilities Manager on a Facilities Maintenance Work Order Form. The Facility Manager will inspect golf carts needing repair to determine the level of work necessary.

- Repair work that can be done in-house by Club staff will be repaired on property.
- Major repairs will be done by a golf cart repair contractor on a time and material basis.

#### Service Contract

The Club has a service contract with an authorized golf cart repair service.

This contract calls for semi-annual and annual servicing of golf carts, according to the following schedule:

## Semi-Annual Servicing

•	Batteries - check	specific gravit	y & <i>OC</i> V.	Jun
---	-------------------	-----------------	------------------	-----

Brakes - check and adjust.
 Apr, Oct

Differential - check lubrication.
 Mar, Sep

Forward-Reverse Switch
 Jun, Dec

- Check contacts and lead connection.
- Lubricate.

## Golf Cart Preventive Maintenance and Repair Program, Continued

Tires Apr, Oct

• Check for wear and damage.

• Check tire pressure.

Wheel Alignment - check.
 Mar, Sep

**Annual Servicing** 

• Batteries - test. Feb

Front Wheel Bearings - check.

Aug

Motor - check.

#### Documentation

All golf cart preventive maintenance and repair will be documented by cart attendants and the Facilities Manager using the following forms:

- Golf Cart Service Schedule, Form 523, maintained for each golf cart by the cart attendant staff and kept in a three-ringed binder on the cart supply shelf.
- Golf Cart Lubrication Schedule, Form 524, maintained for each golf cart by the cart attendant staff and kept in a three-ringed binder on the cart supply shelf.
- Golf Cart Repair Log, Form, maintained for each golf cart by the Facilities Manager and kept in a three-ringed binder on the cart supply shelf.

## Golf Cart Preventive Maintenance and Repair Program, Continued

These completed forms for each golf cart are subject to inspection by management at any time.

Preventive maintenance and repair documents will be reviewed quarterly by the Facilities Manager who will prepare a Golf Cart Preventive Maintenance Program Report, Form 526. This report will be completed, signed, and turned in to the General Manager by the 10<sup>th</sup> of April, July, Oct, and Jan.

# Review I

Give two of the purposes of this training manual.
1
2
What are your responsibilities regarding this training material?
1
•
2
List the six components of the Preventive Maintenance and Repair Program.
· · · · · · · · · · · · · · · · · · ·
1
3
4
5
6
Which three form are maintained for each golf cart and what is the purpose of each?
1
2
3
What form is used to report golf carts needing repair?

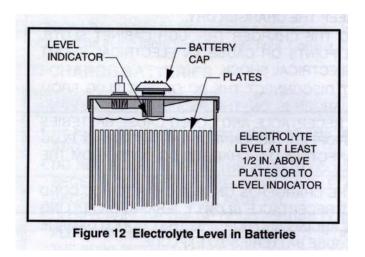


## **Battery Care**

Batteries should be kept clean and free of corrosion. Once a week wash tops and terminals of batteries with a solution of baking soda and water (1 cup baking soda per gallon of water). Rinse solution off batteries.

- Do not allow this solution to enter the battery.
- Dispose wastewater properly by allowing it to flow into the cart wash drain.
- Ensure terminals are tight. Let terminals dry and then spray with battery protector spray (Club Car Part No. 1014305).

The electrolyte level in the batteries should be checked weekly (Figure 12). Add water only after charging unless the water level is below the top of the plates. In this case, add just enough water to cover the plates, charge and then check the level again. Never charge batteries if plates are exposed above water level. For best battery life, add only distilled water.



The hold-down straps should be tight enough so that the batteries do not move while the vehicle is in motion, but not so tight as to crack or buckle the battery case. The



## Battery Care, Continued

terminal connections should be clean and tight, and any worn insulation or frayed wires should be replaced. If the hold-down straps or terminal connections are loose, report the problem to the Facilities Manager on a Work Order Form.

CAUTION: If battery wire terminals are damaged or corroded, report the problem to the Facilities Manager on a Work Order Form so they may be replaced or cleaned as necessary. Failure to do so may cause them to overheat during operation.

After use, the batteries should be placed on charge. The batteries should never be left discharged any longer than absolutely necessary (do not leave discharged overnight).



## **Battery Charging**

To charge a battery:

Insert the charger DC plug into the vehicle receptacle. The charger will turn on two to ten seconds later.

The PowerDrive Charger interacts with an onboard computer on the PowerDrive System 48 vehicle. The computer records the amount of energy consumed during vehicle use. While the charger is plugged in, the vehicle's control circuit is locked out, preventing operation of the vehicle, as well as the possibility of consequent damage to the charger and the vehicle.

Once the lock-out is actuated, the charger turns on. The onboard computer then records the amount of energy being returned to the batteries. When the optimum amount of energy needed to replenish the batteries is returned, the charger will shut off. The control circuit lock-out remains activated until the charger plug is disconnected from the vehicle.

As long as the charger is allowed to shut off by itself, the batteries will be fully charged. Overcharging and undercharging will normally be prevented.

Batteries should be put on charge even if they have been used for only a short period (9 holes of golf or 10 minutes). The charger is automatic and will turn off when batteries are fully charged. If the charger does not seem to be operating properly, or if the batteries seem weak, notify the Facilities Manager who will contact our local Club Car distributor/dealer.

## <u>Plug and Receptacle</u>

If the charger plug becomes difficult to insert or disconnect, the receptacle contacts should be lightly sprayed with WD-40 brand spray lubricant.



## Battery Charging, Continued

The plug should then be inserted and removed several times ensure ease of insertion, ease of removal, and good electrical contact.

If the warning tag has been damaged or removed from the DC cord, notify the Facilities Manager who will have it replaced immediately.

#### Receptacle Fuse Link

As an additional feature to protect the batteries and charging circuit from an overload, the electric vehicle is equipped with a receptacle fuse link (Figure 16).

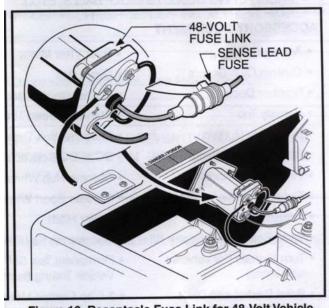


Figure 16 Receptacle Fuse Link for 48-Volt Vehicle

If the charger does not come on when the vehicle is placed on charge, visually inspect the fuse link.



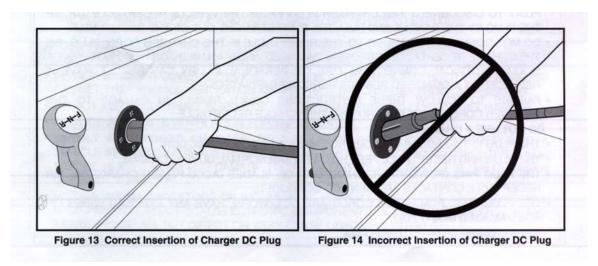
## Battery Charging, Continued

WARNING: If the receptacle fuse link is blown, determine the source of the electrical problem and correct it before replacing the fuse. Notify the Facilities Manager who will contact our Club Car Distributor or Dealer.

#### General Warnings

Be sure all wire connections at the receptacle and the fuse link are clean and tight. Do not rock or bend the plug. To connect the charger plug to the vehicle receptacle, grasp the plug handle and push the plug straight into the receptacle (Figure 13).

Do not pull on the DC cord. Do not twist, rock or bend the plug. To disconnect the charger plug from the vehicle receptacle, grasp the plug by the handle and pull the plug straight out of the receptacle.



Do not connect a charge to the receptacle if the charger cord, plug, or the vehicle receptacle is broken, damaged in any manner, or does not make a good electrical connection. Fire or personal injury can result. Have it replaced by a qualified service person immediately.



## Battery Charging, Continued

Failure to follow these instructions could result in damage to the charger cord, the plug, and (or) the vehicle receptacle.

Do not use a charger if:

- The plug is too loose or does not make a good connection.
- The plug and receptacle feel hotter than normal during charge.
- The plug pins (powerdrive chargers) or blades (accu-power chargers), or receptacle contacts are bent or corroded.
- The plug, receptacle, or cords are cut, worn, have any exposed wires or are damaged in any way.
- Using the charger with any of the above symptoms could result in a fire, property damage, personal injury, or death.
- The DC charger cord and plug are wear items and must be replaced when worn or damaged.

<u>Note</u>. When temperatures fall below  $65^{\circ}$  F ( $18.3^{\circ}$  C), batteries charged in unheated areas should be placed on charge as soon as possible after use. Batteries are warmest immediately after use, and cold batteries require more time to fully charge.

After disconnecting the charging cord from a cart, wrap the cord loosely around the wooden cleat. This keeps the cord out of the way and off the ground.



## Pre-Operation Safety Check

Inspect and drive the vehicle, using the Golf Cart Pre-Operation Safety Check, Form 527, as a guide to check the following items:

#### Vehicle warning decals:

- Lightning Warning Decal on windshield.
- Driver/Passenger Warning Decal center of dashboard.
- Operating Instruction Decal on steering wheel.
- Motor Braking Decal center of vehicle, below dashboard.

#### Brake system:

- All parts in place and properly installed.
- All nuts, bolts, and screws are tight.
- Any unusual noises, such as squeaks and rattles?

#### Tires:

- Visually inspect for wear and damage.
- Check for proper tire inflation (18-20 psi).

#### <u>Batteries</u>:

• Check electrolyte level - at least  $\frac{1}{2}$  inch above plate.



## Pre-Operation Safety Check, Continued

- Check battery posts wires should be tight and free of corrosion.
- Check battery charge light. Is it illuminated?

#### Performance Inspection:

- Brake system when fully depressed under moderate pressure, the pedal should not go more than halfway to the floor. Vehicle should come to a smooth, straight stop within 14 feet.
- Park brake does it hold the cart still? Does it release properly?
- Reverse warning buzzer does it sound in reverse?
- Steering and linkages does cart steer easily without excess play?
- Proper acceleration with key switch on and forward/reverse switch in forward
  position; as accelerator pedal is depressed, the motor should start and the vehicle
  should come up smoothly to speed. When pedal is released, it should return to
  original position and motor should stop.
- Maximum speed is the cart sluggish and seem without power?



## Periodic Service Schedule

The following services should be performed on all golf carts and recorded on each cart's individual Golf Cart Service Schedule, Form 523. These forms are maintained in a three-ringed binder kept on the Cart Supply Shelf.

<u>Interval</u> Daily Service by Attendant	<u>Service</u> Batteries	<u>Detail</u> Charge batteries (after each use only).
Weekly Service by Attendant	Batteries	Check electrolyte level. Add water as necessary per Maintenance and Service Manual.
	Batteries	Wash battery tops and clean terminals with baking soda/ water solution. Dispose of waste water properly.
	Tires	Check air pressure and adjust as necessary (See Vehicle Capacities Chart on Page 17)
Monthly Service by Attendant	Wiper Switch	Check for cracks or other damage; make sure switch is securely fastened to frame. Check movable contact for correct operation.
	General Vehicle	Wash battery compartment and underside of vehicle. Dispose of waste water properly.
		Check brake shoes; replace if necessary. (See DS Maintenance and Service Manual.)

## Periodic Service Schedule, Continued

Brake System Lubricate brake slides per

Lubrication Schedule. (See DS Maintenance and Service Manual Check brake cables for damage;

replace as required.

Semi-annual Service by Contracted Mechanic Only (Every 50 hrs of operation or 100 rounds of golf) Electrical Wiring and Connections

Check for tightness and damage

Forward and Reverse

Switch

Check condition of contacts and wire connections; Make sure connections are tight.

Front Wheel Alignment

and Camber

Check and adjust as required (See Maintenance & Service

Manual, Section 7).

Annual Service by Contracted Mechanic Only (Every 100 hrs of operation or 200 Rounds of golf) Batteries

Perform battery tests per Maintenance & Service Manual.

## Warnings

If any problems are found, do not operate the vehicle until repairs are made. Failure to make necessary repairs could result in fire, property damage, severe personal injury, or death.

<u>Note</u>: The periodic service schedule must be followed to keep vehicle in optimum operating condition. If the vehicle is constantly subjected to heavy use or severe operating conditions, the preventive maintenance procedures should be performed more often than recommended in the service schedule.



## Periodic Lubrication Schedule

The following lubrications should be performed on all golf carts and recorded on each cart's individual Golf Cart Lubrication Schedule, Form 524. These forms are maintained in a three-ringed binder kept on the Cart Supply Shelf.

<u>Interval</u> Semi-Annually by Contracted Technician	<u>Service</u> Brake shaft bearings	Place* 1.	Recommended Lubricant Dry Moly Lube-Club Car Part No. 1012151
(Every 50 hrs of operation or 100 rounds of golf)	Brake Linkage and Pivots	2.	Dry Moly Lube-Club Car Part No. 1012151
	Accelerator push rod pivots and mounts	3.	Dry Moly Lube-Club Car Part No. 1012151
	Forward/Reverse Switch Contacts and charger receptacle	4.	WD 40
	Brake Slides	5.	Dry Moly Lube-Club Car Part No. 1012151
	Front Suspension (5 fittings)	6.	Chassis Lube-EP NLGI Grade 2
Annually by Contracted Technician Only (Every 100 hours of operation or 200	Check/fill trans- axle to plug level	7.	22 oz. (.67 liter) SAE 30 WT. API Class SE, SF, or SG Oil (or higher)
rounds of golf)	Inspect front wheel bearings	8.	Chassis Lube-EP NLGI Grade 2
	(Repack as necessary)		*See Figure 11, Page 17



# Review II

How do you keep batteries clean and free of corrosion?		
How often do you check the electrolyte level in batteries?		
Once you plug in the charger plug, what prevents the cart from operating	3	
A computer shuts off the charger when the optimum charge is reached.	True	False
When the charger shuts off by itself, batteries are fully charged.	True	False
Batteries don't need to be charged if the cart is used for a short time.	True	False
Don't twist, rock or bend plug when inserting/removing from receptacle.	True	False
List three cart components checked during the Pre-Operation Safety Cha	гс <b>k</b> .	
1		
2		
3		
How do you check proper brake performance?		
List three items from the Periodic Service Schedule that you need to che	eck wee	  kly.
1		, 
2		
3		
Who performs semi-annual and annual lubrications?		



## Golf Cart Cleaning

Keeping carts clean is an integral part of the preventive maintenance program and it has a major impact on our members' perceptions of their golfing experience.

Cleaning procedures fall into two categories - Daily Cleaning and Monthly Detailing.

#### Daily Cleaning Procedures

<u>Vacuum - daily after use</u>. Vacuum glove compartments to remove any excess debris.

<u>Brush - daily after use</u>. Use soapy brush to wash off foot tread, tires, bag shelf, and top of canopy.

#### Wash - daily after use

- Spray wash the cart while parked over the drain grate in the cart wash area.
- Wipe down all surfaces with soapy water and a cleaning rag.
- Rinse cart with water.
- Wipe with shammy cloth to remove excess water.
- Wash battery compartment with water.

<u>Windex - daily before use</u>. Spray Windex on inside and outside of windshield. Wipe off with clean rag.

## Monthly Detailing Procedures

Wax - once a month according to schedule



## Golf Cart Cleaning, Continued

- Apply wax to blue body components as per instruction on the can.
- Wipe off with a terry cloth and polish with a power buffer.

<u>Armor-All - once a month according to schedule</u>. Apply to foot tread and bag shelf as directed on the can.

<u>Tire Polish - once a month according to schedule</u>. Apply to tires as directed on the can.

#### Detailing Schedule

- The following schedule will detail each cart every three weeks, allowing a make up week to complete all carts once a month:
  - Tuesdays through Thursdays 5 carts/day
  - Fridays through Sundays 3 carts/day

Detailing of carts will be tracked on the Monthly Cart Detailing Report, Form 515. The report will be signed by the  $1^{st}$  Golf Professional, submitted to the Head Golf Professional for review, and forwarded to the General Manager by the  $5^{th}$  day of the following month.



## Golf Cart Storage

The Cart Barn has designated parking stalls for each golf cart. The stall designations match the numbered decals on the golf cart. Stall designations are located on the wall behind each two stalls.

Keeping carts in their assigned slots makes it easier to rotate the cart fleet ensuring uniform levels of use for all carts.

Each stall has a corresponding battery charger cable to recharge the batteries on carts. After charging, hang the charging cable on wooden cleats to keep the cable off the ground.

For a diagram of the Cart Barn with stall designations, see Cart Barn at Appendix B1.



## Cart Fleet Rotation

Each golf cart has a numbered-decal to identify it.

The Cart Barn has striped parking stalls for all golf carts. These parking stalls are also numbered with numbers corresponding to the numbers on carts. Cart attendants will be instructed to park all carts in their assigned stalls.

Each day, sufficient carts will be pulled out of the Cart Barn to provide for the expected level of play. Carts will be pulled out in sequence, beginning with the next numbered cart from the last cart used the previous day.

Cart Attendants will keep track of which carts are used each day by means of a Cart Usage Tracking Sheet, Form 508. This form will be maintained in the Cart Attendants three-ringed binder that is kept on the Supplies Storage Shelves in the Cart Barn.

If any cart is malfunctioning or in need of repair, it will be skipped in the normal rotation and noted on the Cart Usage Tracking Sheet.

Once a month as close to the last day of the month as possible, Cart Attendants will read the charge on each cart with the Battery Usage Meter and record it on a Monthly Cart Battery Usage Report, Form 509. This form will be turned in to the 1<sup>st</sup> Assistant Professional when completed.



# Review III

List the four daily cleaning procedures for golf carts.
1
2
3
4
List the three monthly detailing cleaning procedures for golf carts.  1
2
3
How many carts a day must you detail on Tuesday through Thursday?
How many carts a day must you detail on Friday through Sunday?
What form do you record detailing of golf carts on?
What is the purpose of numbering cart stalls in the Cart barn?
What should you do with charger cords after you disconnect them from carts?
What form is used to record battery charge?
How often do you read battery usage?



## Training Critique

The development of training material is an ongoing process. Some things don't work as well as we envisioned. Our members don't respond as we hoped. New things come up. Employees suggest better ways of doing things.

The aim of all of our training is to equip you with the right knowledge, skills, and abilities to serve our members well and to help you do your job as professionally and effortlessly as possible.

As a result, we need to hear from you. Tell us what works. What doesn't work. Do you have a better idea? What are our members saying? What are their comments and suggestions?

Provide us with the necessary feedback to make our training current, relevant, helpful, and of the highest possible quality. You and your fellow employees deserve nothing less!



## Appendix A1 - Monthly Cart Detailing Report

Club Resources International	37. 1	F	Monthly Cart D	etailing Report
	Month	/Year:		
Cart # Date Detailed	Detailer's Initials	Cart #	Date	Detailer's Initials
1		37		
2		38		
3		39		
4		40		
5		41		
6		42		
7		43		
8		44		
9		45		
10		46		
11		47		
12		48		
13		49		
14		50		
15		51		
16		52		
17		53		
18		54		
19		55		
20		56		
21		57		
22		58		
23		59		
24		60		
25		61		
26		62		
27		63		
28		64		
29		65		
30		66		
31		67		
32		68		
33		69		
34		70		
35		71		
36		72		
			4 . 4 . 6 100 0 1	
Form 515			1st Asst. Golf Professional's Signa	ture Effective: 2/14/00

# Appendix A2 - Golf Cart Service Schedule

(	Club Resources Internati	onal									G	olf Ca	rt Serv	ice Scl	nedule
	Person performing service must initi	al in appı	ropriate b	lock belo	w.					Golf	Cart #:				
We	ekly Service	Week:	1/2	3/4	5/6	7/8	9/10	11/12	13/14	15/16	17/18	19/20	21/22	23/24	25/26
	Check battery electrolyte level.														
	Add water as necessary.														
		Week:	27/28	29/30	31/32	33/34	35/36	37/38	39/40	41/42	43/44	45/46	47/48	49/50	51/52
		Week:	1/2	3/4	5/6	7/8	9/10	11/12	13/14	15/16	17/18	19/20	21/22	23/24	25/26
2	Wash battery tops, clean terminals														
	w/ baking soda solution.														
		Week:	27/28	29/30	31/32	33/34	35/36	37/38	39/40	41/42	43/44	45/46	47/48	49/50	51/52
		***	1 /0	2/4		7.0	0/10	11/12	10/14	17/16	15/10	10/20	21/22	22/24	25/25
3	Check tire air pressure.	Week:	1/2	3/4	5/6	7/8	9/10	11/12	13/14	15/16	17/18	19/20	21/22	23/24	25/26
3	Correct as necessary.														
	Correct as necessary.	Week:	27/28	29/30	31/32	33/34	35/36	37/38	39/40	41/42	43/44	45/46	47/48	49/50	51/52
		WCCK.	21/20	29/30	31/32	33/34	33/30	31/36	37/40	41/42	43/44	43/40	47/46	49/30	31/32
Mο	onthly Service	l		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	Check wiper switch. Look for dama	ge,					- P				3.18	~			
	looseness, movable contact.														
2	Wash battery compartment and														
	underside of vehicle.														
3	Lubricate brake slides. Check brake	:													ĺ
	cables for damage.														
	ni-Annual Service														
1	Check electrical wiring & connection	ns													
	for tightness and damage.														
2	Check forward/reverse switch -														
_	contacts & connection tightne														
3	Check and adjust wheel alignment at	nd													
	camber.														
	nual Service Perform battery tests.														
1	r errorm battery tests.														
	I														ш
	Form 523													Effectiv	e: 3/1/00

## Appendix A3 - Golf Cart Lubrication Schedule

(	Club Resources International									Golf (	Cart Lı	ıbricat	ion Scl	nedule
	Person performing service must initial in appropr	riate block	k belov	W.					Golf	Cart #:				
	ni-Annual Lubrication	<u>J</u>	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	Brake shaft bearings.													
2	Brake Linkage and Pivots													
3	Accelerator push rod pivots & mounts.													
4	Fwd/Reverse switch contacts & charger receptacles.													
5	Brake slides.													
6	Front suspension (5 fittings)													
Anı	nual Lubrication													
1	Check/fill trans-axle to plug level.													
2	Inspect front wheel bearings. Repack													
	as necessary.													
	Form 524												Effectiv	e: 3/1/00

## Appendix A4 - Golf Cart Repair Log

Club Resource	es International	Golf Cart Repair Log
	Golf Cart #:	
	Describe all repairs to this golf cart.	
Date	Repairs Completed	Initials
<u> </u>		
		+
Form 525		Effective: 3/1/00

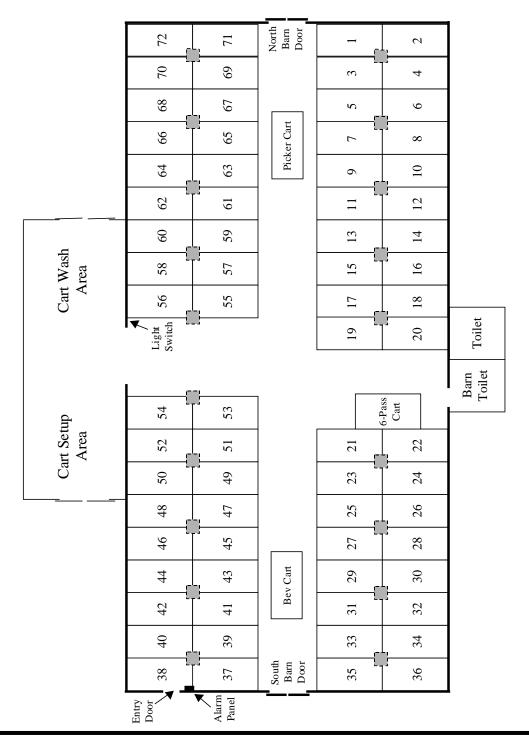


# <u>Appendix A5 - Monthly Cart Battery Usage Report</u>

			Date:	
Battery		Cart	Battery	
Reading	Comments	#	Reading	Comments
		_		
		_		
-			+	
		_		
-				
			+	
		_		
			+	
		_		
			41 42 43 44 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72	41   42   43   44   44   45   46   47   48   49   50   51   52   53   54   55   56   57   58   59   60   61   62   63   64   65   66   67   68   69   70   71   71   71   71   71   71   71



## Appendix B1 - Cart Barn Layout





# Appendix B2 - Cart Supplies and Cart Wash Areas

