



Adventure Travel
4x4 Expeditions
Consultancy
Training



OneLife Adventure Expedition Vehicle Preparation Guide.



get these right and the worlds your oyster

Off road vehicle preparation is a broad subject, all 4x4 vehicles are intended for use off road, the trick is to define what you are attempting to achieve before starting any work. Your vehicle can be tuned to meet the requirements of occasional green lane trips and play days to hard core trans Saharan expeditions. The purpose of this guide is to help choose the right vehicle, fit the best accessories that you really need and then pack it to ensure you enjoy your expedition – it is after all a holiday.

Vehicles can be equipped with axle diff locks, stronger drive shafts, roll cages, front and rear winches, extra lighting, up-rated battery systems, under body protection, up-rated suspension, storage and navigation, etc – it's a question of defining what you really need. Our general advice is keep everything simple, keep the engine standard. Chips and power upgrades don't really belong on expeditions.

The key to successful specialist vehicle preparation is based on the correct selection of vehicle and equipment to meet the tasks required. Selecting the best base vehicle for your planned use, combined with high quality products from all over the World with first class workmanship is a recipe for success.

VEHICLE CHOICE

Land Rover

Land Rover vehicles have been modified and improved extensively over the years. There are few countries in the World that you wouldn't find a Land Rover product working or at play. The Defender is the most popular Land Rover model to be converted to suit owner's requirements and the amount of equipment available is inspiring to say the least. Accessory manufacturers are constantly looking for new products to produce.



Defender

The Land Rover Defender is an icon, following in the wheel marks of the Series 1,2 and 3, the 90, 110 and 130 inch wheel base Defender models are as rugged as they come. It remains the popular 4x4 of choice for recreational use, hard core off road, overland and specialist applications such as rescue and utility vehicles. Because the Defender has a separate chassis and a simple flat sided body it is relatively easy to customise them, with bodywork alterations to suit customers requirements. Popular conversions being Defender 90 'King cabs' and 130 5 door hard tops and station wagons.

Discovery

The Land Rover Discovery in all its various models has proved very capable in off road and overland arenas. The Discovery shares a lot of the same rugged design features found on the Defender but with a greater degree of comfort. Family car in the week, off roader at the weekend and overlander for Europe and shorter desert trips.

Range Rover

A luxury 4x4, about as good as it gets combining off road ability with motorway comfort. But they're rare beasts on the overland routes.

Freelander

Although specialist equipment is limited, the smallest Land Rover meets many people's requirements when occasional UK or Europe use is the intention. It is possible to make the Freelander more trail ready and to enhance it's on and off road performance, with some underbody protection and bigger wheels/taller tyres. The auto box option is the best.

Toyota

Toyota four wheel drive vehicles are the most commonly seen working hard all over the World, the harshest environments of Australia and Africa are testing grounds for these tough 4x4s. The Land Cruiser and Hilux in numerous forms are used extensively in mining operations and aid agencies as well as game viewers and recreational use. The level of specialist equipment available is only matched by that of Land Rover and the applications are almost limitless.



Land Cruiser

Produced since the '50s the Land Cruiser has been sold all over the World in various forms, from basic utility models built for work though to the luxury flagship, the Amazon. Some models lend themselves to hard core use better than others, 40 Series Cruisers are great fun but for overland use then look to the 60 Series and the awesome 80 series commonly known in the UK as the VX.

The 80 Series is possibly one of the best value vehicles for overland expeditions due to its reasonable purchase price, huge product availability, legendary reliability, impressive off road ability and long distance touring comfort. Little modification is needed over standard to make these capable of world spanning expedition use. More unusual options include the rugged 75 and 78 series pickups and troop carriers. Newer models, both Colorado and Prado variants, can be considered while the impressive 100/105 Series Amazon is set to be the successor to the workhorse 80 Series as second hand values decline and overlanding equipment from around world is developed for these models.

Hilux

The Hilux is also a Toyota legend, not even Jeremy Clarkson from BBC's Top Gear could destroy one!

Available in single and double cab models for many years, early models were built on bumpy but tough leaf springs but now use more supple leaf springs on the rear with torsion bars and independent suspension up front. The body style has remained much the same until the very latest Vigo model that has undergone a complete style makeover. There are model variations built for specific markets that are finding their way to the UK including the Surf and Four Runner. Possibly intended more for work than play nevertheless there is a large range of specialist equipment available to make the Hilux suit it's owners chosen application.

Nissan

Nissan have been producing vehicles almost as long as the likes of Jeep, Land Rover and Toyota, often passing unnoticed. Models include the Patrol, Navara, Pathfinder and Terrano. Most focus is on the Patrol and Navara models, with the Patrol for both hard core off road and overland use., but the Pathfinder and Terrano are good for European touring.



Patrol

The Nissan Patrol is used extensively in Australia and Africa and is tough and reliable with an air of luxury with high spec models. In our opinion it's a very underrated 4x4. All the coil-sprung models dating from the early '90s are very impressive off road and represent excellent value for money. Unlike its main competitor the Toyota Land Cruiser 80 and 100 Series, the Patrol is available in long and short wheelbase. The strength and reliability of the Patrol are its main strengths. Plenty of kit is available to enhance the Patrol for off road and overland use globally. Its heavy and under powered in the common 3 litre engine options but with a 4 litre engine it will give any Land Cruiser a run for its money

Navara

The Navara is a capable 4x4 and is often improved for serious work and leisure use but probably not the best overlanding choice. More recent models include the Navara pickup in both single and double cab models. The level of equipment available is basic but the Navara can be put to work as is or slightly enhanced for off road fun in the UK.

Jeep

Conceived in the late '30s, Jeep has written the book on four-wheel drive, all the other manufacturers have taken inspiration from this famous manufacturer of four-wheel drive vehicles.

Used primarily as a fun 4x4 for both recreational and hard-core off road activities it is unlikely you will come across a Cherokee fitted with a roof rack in the Sahara Desert. It's more than capable but it just doesn't happen.



Cherokee

Various models are available but the obvious choices are between the Cherokee and Grand Cherokee with a recent addition the Liberty. Equipment is sourced mainly from the USA and Australia. There are a number of very specialist firms in the US kitting out Cherokees for Rock Crawling. Early Cherokees represent excellent value providing good on and off road manners, with some minor upgrades the off road performance can be very impressive.

Wrangler

The end result of well over 60 years of 4x4 development. The latest Wrangler is a style icon, the Land Rover Defender only coming a close second. The Jeep is recognisable wherever it goes. Due to American regulations the standard vehicle is low and has small wheels, however with some modifications the Wrangler can still lead the way in any off road environment, never intended as a load carrier or an overland vehicle, the Wrangler is pure off road fun.

Mitsubishi

Shogun as it is known here, Pajero everywhere else in the World has become one of the most popular 4x4 vehicles here in the UK, The number of mid '90s Japanese imports is huge and they represent good value with high spec low mileage examples.

The L200 Pickup is extremely popular, sharing common parts with the Shogun sport or Challenger.



Shogun/Pajero

The Shogun or Pajero has been available in the UK for some 20 years. It has a loyal following and is used both as a tow vehicle and a recreational 4x4. Not commonly seen in hardcore competition despite the factory's achievements in the Dakar Rally.

A reasonable amount of kit is available for off road preparation with suspension and snorkels being popular upgrades.

L200

The L200 double and single cab pickups are available in '4 Work' models through to the Animal and Warrior high spec version. Hugely popular and with plenty of specialist equipment to improve its off road ability.

Other

Plenty of oddities remain, all capable in their own right but rarely seen, at least driven by Brits – G Wagons, Suzuki's, Unimogs, Pinzgauer's, Mahindras, Vauxhalls, 4x4 Transits and Iveco Vans as well as specialist off road HGV conversions. If we were to head north to Russia or Scandinavian cold climates then the roof tent would come off and we'd be looking at the serious weather protection that a full body conversion would give, with Pinzgauer or Unimog at the top of our list. It's all about matching the type of vehicle to where you are planning to travel.



Vehicle modification and preparation



Once you have acquired your base vehicle the first thing to do is get it thoroughly checked out by a firm specialising in overland vehicles. What could be acceptable on a vehicle used in the UK may be unacceptable on a vehicle used many miles and days away from a garage elsewhere in the world. GreenFlag don't do recoveries from the Sahara! Most models have a weak spot – get it checked out now so it can be rectified if needed before all your budget is blown on the additional equipment.

An understanding of the terrain, climates and uses the vehicle will face, comprehensive vehicle and equipment technical knowledge are your primary selection criteria when considering which company will be trusted to modify your chosen vehicle.

Products

Modern Expedition vehicles are well-equipped utilising all the comforts from home such as; long-range fuel tanks, battery management systems, roll cages, roof racks, water tanks, purification equipment & hot showers, engine pre-heaters, roof tents, custom storage, up-rated suspension, protection, security, navigation equipment, winches and recovery equipment etc. The only limit is your budget – but ask yourself do you really need it, remember – KIS.

Suspension

This is the first and a virtual essential extra to consider. Vehicle suspensions specified for road or normal off road use will be not be able to carry the heavy loads for long periods over hard terrain that typifies expedition use. Virtually every suspension set up will be a compromise unless all you plan to do is heavy expedition use only or conversely only occasional weekends. By combining springs and shocks from a very comprehensive range such as Old Man Emu or Terrafirma it is possible to fit a suspension package that will transform the load carrying and handling both on and off road to a great degree. Lift heights should be limited to 2", higher will lead to extreme wear in bushes and UJ's leading to the need for caster correction kits and more spares to carry.



Underbody Protection Equipment

This would be the next thing to consider. Some vehicles require more protection than others. Land Rovers, notably Defenders will need steering rod and front diff protection, Toyotas less so. All vehicles will benefit from rock sliders, both as protection and recovery but also as a convenient hop up step when putting your tent away. Unfortunately Moroccan kids are fairly adept at jumping on them as well.

Fridges

A piece of kit that we now consider essential would be a fridge +/- a freezer to keep your food fresh and therefore you healthy. It can also contribute to keeping your menus varied on extended trips – not to mention a chilly beer at sunset.



We use an Engel but National Luna is also excellent - popular sizes include 35, 40 and 50 litre capacity units, these are proper compressor fridge freezers capable of freezing to minus 20 degrees in plus 40 degrees ambient temperature while be shaken continuously.

Low power consumption and high insulation properties ensure that these fridges will minimise battery power consumption, most drawing around 2 amp/h.

Protective jackets, fitting kits and sliding mounting decks are available to help you fit them in the car and keep them accessible.

Bumpers, Winches and winch mounts

While a winch is not needed generally for group travel, it becomes more essential when travelling solo. If you are fitting a winch then fit it into a well designed winch bumper bull bar. Most will come with recovery and HiLift points built in.

We use and recommend Warn winches, Warn is synonymous with off roading and produce a winch to suit every 4x4 vehicle application. They have proven to be robust, even when used occasionally. If you fit a winch then try to use it at least once a month, even with no real load on it, to keep solenoids dry and corrosion free. There's no point having one if its corroded and fails when needed in anger.

Batteries and battery management systems

By now you may have added a lot of additional electrical load on the car –winches or ancillary electrical equipment so additional batteries and management systems will be needed. The systems provide safety and reliability for your on board and most importantly starting electrics, keeping you aware of the battery condition with a monitor. Nothing that draws current with the engine switched off should be connected to the vehicle's starter battery – any extras fitted should be connected to the isolated auxiliary battery. Its worth fitting a few power



sockets around the car but don't use the standard cigarette lighter socket type as they are not rated for high and continuous current draw, use the DIN type. It's worth fitting a USB power outlet these days into the cabin area, check out www.mudstuff.co.uk for switches and power outlets.

Raised air intakes and breathers

Useful in heavy dust or deep water to reduce the amount of dust/water drawn into your filter. Raised breather kits are used to ensure that water is not drawn into transmission casings when wading. A really useful addition is a cyclone type cleaner on the top of the snorkel. They make a dramatic reduction in the amount of dust trapped in your filter, lengthening service intervals, keeping engine performance high and extending filter life.

Fuel and water

Additional fuel and water storage on overland vehicles is an important subject. Fuel tank options include, replacing the original tank with a larger one or the addition of an auxiliary tank to supplement the original. The installation of these tanks may require transfer pumps, separate fillers, gauges and senders. Don't write off jerry cans, they are flexible and give cheap additional fuel storage. Strapped onto a roof rack they can be filled in place and emptied easily with a long hose from the rack to the filler neck. Try not to put jerry cans in the car, they will leak and contaminate other kit with diesel.

There are few vehicle specific water tanks, in most cases a universal tank is used that best suits the available space, custom stainless water tanks can be made if required. Tanks can be emptied by gravity although a pump is often more effective and can be coupled up with water filters for high levels of bio security. Plumbing and a tap will need to be considered. It's possible to fit hot



water power showers, while attractive initially, most only see occasional use. A bucket wash with a sponge under the desert stars is a real experience !

Recovery Equipment

Safety during vehicle recovery operations is paramount. All the equipment used should be rated and stored to keep if dry, free of oil and abrasion. A basic kit would be 2 bow shackles, a 3m wide tree strop, a kinetic recovery strap and a swing away snatch block if travelling solo. HiLift jacks are recovery tools and should not be used for tyre changing and mechanical work. We use one about once a year, they are heavy and awkward to carry, you can guess I'm not a fan. Carry a small 10 tonne bottle jack for tyre changes, it's easier and safer.

Roof racks and Accessories

A roof rack is useful for carrying tents, extra jerrycans, gas cylinders, firewood, for hanging awnings off and hanging other kit on. Make sure it's robust and well fitted onto the vehicle, choose one with at least 4 support legs, use more if available. Roof bars can be used if you are only fitting a tent and are a cheaper, lighter option.

Roof Tents and Awnings

While rooftop tents are not essential, unless travelling in places where animals want to eat you, they are quick to erect and immune to rocks, boulders and ground conditions. They are cold, can leak and be prone to condensation in cold/wet weather situations so for these climates a good ground tent may be your first choice. We have used a Hannibal tent for years and it's proven tough and comfortable, though we have upgraded the mattress to 75mm of heavy duty upholstery foam. Bedding can be left in the tent.



OzTents are good in some situations where you want a cube of living space and don't want to be climbing up ladders late at night. They are quick to put up but can be slow to put down and can twist the frame if doing it single handed in windy conditions. The folded package is a bit cumbersome to handle solo and best carried up on the roof, either on bars or in a basket frame

Lighting

Let's deal with additional driving, spot and variable beam lights first – not needed as you should not be driving at night. It's better to fit headlamp upgrade bulbs for the occasional use at night. Lamps on your bull bar are prone to damage, impede air flow to the engine, lamps on the roof rack reflect off the bonnet and get in the way of tents.

Fluorescent or LED strip lights work well for interior lighting and general camp lighting. Strips can also be fitted into roof tents or hung in ground tents. They will all reduce battery life so if you need a lot of lighting then you will need a lot of battery amp hours

Diff locks and transmission upgrades

Most 4x4's will have a centre diff lock and this will be sufficient for 90% of the time. If you are expecting miles of mud and bogs then axle diff locks are worth considering, particularly on the rear axle. Toyota Land Cruisers tend to have them as standard fitments for European spec models while imports tend to have limited slip diffs as standard. Sustained axle diff lock use will place greater strain on transmission components so you may need to consider up-rated half shafts and special propshafts.

Tyres

We use BF Goodrich and Cooper, normally in an All Terrain tread pattern and this is perfect for sand, rock and short mud sections. For soft muddy going you will need a Mud pattern tyre but be careful on sand with MT's – they can dig ferociously when spinning. The main requirements are hi-ply, protected side walls, the ability to run at low pressures for sand driving and a tough compound to survive rock driving. While talking about tyres, you'll need a robust, hi-capacity compressor for desert use where you'll be regularly altering pressures. Bead locks are generally not needed for sand driving unless you know that very soft conditions and continued extremely low pressures will be encountered – the Murzuk Sand Sea in Libya springs to mind here. Pack a repair kit and practise using it but one spare tyre is generally enough.



Brake upgrades

A fully laden expedition vehicle weighs significantly more and will be harder to stop. Brake discs can be upgraded to cross drilled and grooved types for better heat dispersion and are available in solid and vented types. On some vehicles calliper upgrades are possible so bigger pads can be fitted. If this is not possible then it's worth experimenting with different pad materials and grades.

Tools and spares

These can add a huge amount of weight into your vehicle so choose carefully. Make sure that you have the tools needed to adjust most things on the car but you don't need both imperial and metric sets. If you have changed wheels then make sure the wheel nut socket is long/thin enough to reach into deeper dish wheels. Carry a hub nut socket. If travelling in a group then this gives a real opportunity to save weight – you don't need a torque wrench in every vehicle.



Spares are another potential mine field, if you have followed our advice about buying carefully and have checked the vehicle over thoroughly then you should not need a huge amount of spares. A set of filters, belts and hoses is sensible, along with 2 sets of wheel bearings and seals, brake pads, a UJ and a drive flange is about the minimum you can get away with. The further you go, then the more its prudent to carry, long desert trips are worth carrying a clutch for. Vehicles with automatic transmissions should carry a spare starter motor as it's the only way to start them. A box of sealants, glues, nuts and bolts and odds and ends is worth carrying along with about 1 litre each of vehicle oils and fluids. You can't carry everything you may need in every potential situation so make a note of your UK mechanics number – DHL can ship most things to most places quickly. Don't ignore local solutions, I have seen some very unorthodox solutions and bush mechanics work well enough to get you out of trouble. One final thing worth carrying is a factory workshop manual, it will help you fix things but also acts a source of diagrams for pointing at in foreign garages when you have no common languages!

Packing

Probably the most important thing is that you think about the storage of the kit you take. You have two options, essentially the flexible multi box approach or the regimented compartment/draw option. Neither are wrong, it's just people approach organisation in different ways. Basic guidelines are heavy at the bottom, least used to the back, try to have a load guard fitted between the passenger and the load compartments. This will keep the passengers safe from flying boxes and reduce the need to strap all the kit down. When buying food, try to avoid glass containers and put a layer of closed cell foam in the bottom of boxes and drawers to protect items and prevent squeaks and rattles.

If you choose boxes then you won't go far wrong with the Wolf/FlatDog boxes. They are strong plastic boxes, well sealed from dust and have a multitude of additional uses from impromptu seats, table supports and hop-ups. Pack boxes so the weight remains manageable, you'll have to pick them up several times in a day. When packing consider what you will want to get at quickly and frequently and pack both the car and the boxes with this in mind. The final solution will be specific for you and the way you want to travel - many of our guests undertake a weekend with us first as a "practice run" to sort this out.



Keep as much weight out of the car as possible, pack lightly, with often used/needed things easily accessible and you'll be the first on the dune to watch the sunset, rather than still looking for the matches to get the kettle on in the dark.

Weight and overloading are your enemies !



This guy is definitely taking too much !!

So in summary what does this all mean on OneLife expeditions

UK Weekend Explorer

These weekends are designed to be non-damaging and suitable for standard vehicles. Our support teams are on hand to spot you through any obstacles that may cause you problems. However you may wish to put basic underbody protection on your vehicle – for example Land Rovers would benefit from having a front differential and steering guards fitted as these components are exposed and prone to damage. A CB radio is useful and tyres of All Terrain or Mud Terrain tread patterns are most suitable.

Foreign Explorers

The level of preparation can vary widely according to taste and pocket as well as actual need! As a minimum we would recommend your vehicle having a full service and check immediately prior to departure and some underbody protection fitted. A CB radio must be fitted. A suspension upgrade/lift is almost essential matched to the load carried and terrain encountered. Tyres of either All Terrain or Mud Terrain patterns are most suitable. A set of recovery equipment (strops and shackles) is essential along with a spade. We can advise on any additional fuel and water requirements specific to the expedition. Roof tents, water systems, awnings, lighting all make it easier to live with your vehicle but remember

KIS – keep it simple



Happy travels

Paul and Anne