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Civil Aviation Authority of Sri Lanka

"සැමට සුරැකි අහසක්"
"அனைவருக்கும் ஆபத்தற்ற ஆகாயம்"
" Safe skies for all"

තැ.පෙ. 535, කොළඹ.
அ. பெ. இல. 535, கொழும்பு
P. O. Box 535, Colombo.

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No. 04, Hunupitiya Road, Colombo 02, Sri Lanka.

From :The Director General of Civil Aviation & Chief Executive Officer

මගේ අංකය / எனது இல. / My Ref. No. AE/01/14 (CA/15/0716)

දිනය / திகதி / Date 31 December 2015

Secretary,
Ministry of Transport and Civil Aviation.

Development of an airport in Puttalam District

Reference the discussions that took place at the Palaviya airport on 06th December 2015 with the headship of the Hon. Minister of Transport and Civil Aviation and in attendance of a few Parliamentarians Provincial Councilors of the district and other senior government officials involved in civil aviation.

As per the instructions given by the Hon. Minister at the discussion, a detailed study was conducted as to the feasibility of development of Palaviya Airport. During this study, it was observed that development of Palaviya airfield is not feasible due to presence of man-made obstacles in close proximity to the airfield which projects above the most vital airspace segments needed for safe operation of aircraft. Although reorienting of the direction of the existing runway clockwise was viewed to be an option to obviate the above problem, the direction of predominant wind (studied with data given by the Met department for a period of 10 years) in the area does not support such action, due to rising of a significant crosswind component, which is not favorable for aircraft operations.

Even if it was feasible, the runway would then be used only for one traffic circuit (south of runway) and the use of the other side would be completely restricted due to aforementioned obstacles. Since the entire runway, taxiway, apron and terminal building have to be constructed anew, proceeding with such option is viewed to be not expedient due to high cost of development and low return benefits.

Hence, in liaison with Divisional Secretary, Puttalam, the feasibility of locating an airfield on a Greenfield was explored. A land was identified in Kalladi area which is suitable for location of a completely new airport, without major encumbrances. Accordingly preliminary study was done as to construction of a code 2C runway (1200 m long and 30 m wide) which is capable of handling aircraft carrying less than 50 passengers on that land which should be around 40 hectares in extent. The cost of development of this airfield is estimated to be Rs.750 million. If the airport picks up demand, it has the potential for further development progressively.

The attached report encapsulates the findings of the feasibility study. You may please appraise the Hon. Minister accordingly.

H.M.C.Nimalsiri
Director General of Civil Aviation and
Chief Executive Officer

Copy to:
Hon. Minister of Transport and Civil Aviation
Chairman, Civil Aviation Authority of Sri Lanka
Airport and Aviation Services Ltd.

දුරකථනය /தொலைபேசி / Tele. : 94-11-2304606 ෆැක්ස් /பெக்ஸ் / Fax. : 94-11-2304706 වෙබ් /வெப் / web : www. caasl.lk
ඊ මේල් /ஈ-மெயில் / e-mail. : sldgca@slt.lk, sldgca@caa.lk

DEVELOPMENT OF PALAVIYA AIRFIELD

Feasibility Report

DECEMBER 31, 2015

CIVIL AVIATION AUTHORITY OF SRI LANKA
No.4, Hunupitiya Road, Colombo 2

Executive Summary

Given the vast potential inherited in aviation, a city which has an airport is better placed in achieving its socio economic development goals faster than a city that is without it. Airports facilitate expeditious movements of people and goods whilst creating opportunities for direct, indirect and induced multifaceted economic activities centering the airport.

Sri Lanka has 16 airfields located in the different parts of the country. However, there is no serviceable airfield in the North Western Province. The North Western Province is rich in history, diverse in ethnicity, religion and has a potential for development in the agriculture, industries and tourism. It could also capitalize on its inherited sunny weather during major part of the year and flat land for promotion of aviation related activities, flying training and sports aviation in particular. The type of tourism that is promoted in the area which is more out bound activity oriented could also draw potential investments in aviation sports.

The high-end tourists who are expected to patronize the resorts at Kalpitiya would be more inclined towards safer means of conveyance and shorter travelling time to destinations thus an airfield at close proximity will enhance the total outlook of the region. It will be an attractive conduit between the west coast and east coast which are equally rich but diverse in their offering to tourists.

The Government in its Annual Budget-2015, identified the need of establishing an airport in Puttalam District through a PPP arrangement (vide para 398 of the Budget speech -2016). In this connection, Hon. Minister of Transport and Civil Aviation made an official visit along with a few of the Parliamentarians representing Puttalam district to Palaviya airport in November 2015 to explore the possibility of resurrecting it for civilian passenger operations.

Consequent to the decisions reached at the discussions held with all concerned during the above visit, the CAASL was entrusted to submit a report on the feasibility of developing Palaviya airport together with a cost estimate, if it is found to be a viable option.

During the detailed study, the CAASL has observed that further development of Palaviya airfield is severely crippled by man-made obstacles located in the vicinity of the airfield and unless they are removed, there is no use of developing the airfield at huge cost, as its effective use is restricted by the obstacles.

The study also revealed that it is only a limited space of land which can be made use of for the airport development and all other infrastructure including runway, taxiway, apron and terminal building and other ancillary facilities are to be provided afresh, even if the current location of Palaviya airport is selected for development.

It would be expedient to construct a completely new airport in a government land which is closer to Puttalam town and which does not pose any limitation for the effective use of the airport. On query, the Divisional Secretary, Puttalam suggested a vacant government land closer Kalladi which can be made use of, for the purpose, if found feasible from civil aviation point of view.

Kalladi is a small township, located only few kilometers away from Palaviya on Puttalam – Kandy Road and the location is viewed to be suitable for construction of small airfield which can accommodate aircraft carrying less than 50 passengers. The site has potential for future development as well, if the growth of traffic so demands.

1 Introduction

1.1 Puttalam District

Puttalam District is one of the 24 administrative districts in Sri Lanka situated in the North Western Province. It is situated 130 km (81 miles) north of Colombo and 95 km (59 mi) north of Negombo. Puttalam is the capital of the Puttalam District and governed by an Urban Council.

1.2 Topography of Puttalam District

Puttalam which is the home land of chronicle of Sri Lanka is a sacred land of prolonged histories. The administrative district Puttalam is surrounded on the North by Kala Oya, bordering Mannar district, East by Kurunegala and Anurdhapura districts, South by 'Ma Oya' bordering Gampaha district and West by Indian Ocean. The length and width of the district is 120 km and 50 km respectively.

The district has a land area of 3,013 m^2 including inland water bodies and a coastal belt of 288 km in length. Deduru Oya, Mee Oya, Battulu Oya and Rathambala Oya, flow through nourishing the district.

There are three classifiable climate zones in the district viz. wet zone within Ma Oya and Deduru Oya; dry zone and semiarid nature, an area of Deduru Oya to northern border of the district and an area with sand and sand dunes with significance of aridity in Kalpitiya Peninsular.

Puttalam district is known for energy production, salt and coconut production and fishing. It has one of the largest lagoons in the country and the largest sanctuary of Sri Lanka; Wilpattu.

1.3 Historical Background

The Puttalam which claims for prolonged history was known by Mangala Thotupola in ancient time. The history of Puttalam dates back to the arrival of Prince Vijaya, nearly 2500 years ago, when his vessel washed ashore to "Thambapani" which is located Northern side of Puttalam lagoon. It was the place of origin of Sinhalese lineage.

Further it was also the dwelling place of "Queni" who helped the Vijaya to become a Prince. Later, Queni shifted her dwelling to "Thonigala" in Anamaduwa division as the Prince Vijaya had married the princess "Vijayee" from India.

The name "Puttalam" may be a modification of the Tamil word Uppuththalam, of which Uppu means salt and Thalam means salt production zone, thus evolved into the name Puttalam. The Dutch Fort which is used by the Sri Lankan Naval forces even at present and the Palaviya Airfield, used during the World War II, are identified as the places of direct linkage with Sri Lankan history.

The Paru Elas (Canals) constructed during the Dutch period to ferry the trading goods from Colombo to Puttalam and vice versa in those days are also situated within the district. The coral reef off the coast of Puttalam is one of the factors that Sri Lanka to become famous.

The Pallama division once ruled by Nanthamithra, the chief disciple of Prince Dutegemunu is also one of the Divisional Secretarial (DS) divisions in the district. It was at ancient Rajamaha Vihara, Paramakanda in Anamaduwa division the popular paintings of 05 interlocking Swans are placed. The Munneswaram Temple, situated in Chilaw Division secretariat is a sacred place for both Hindus and Buddhists. There was a saying that it was the temple called by the name "Munisoama" during the rule of Dambadeniya Kingdom.

The Iyenak Devalaya is situated in Deduru Oya area and Thanivel Devalaya in Madampe are places of historically significant. The St. Anne's church Thalawila, the sacred place of Catholics is also situated in Kalpitya D.S division in the district of Puttalam.

1.4 Economic Strength

The Puttalam district is resourceful in regards to paddy cultivation, agricultural crops, fruits and vegetables, fisheries, industrial raw materials, wildlife and tourism.

1.4.1 Economic Crops

The coconut triangle belongs to the Puttalam district and contributes immensely to the economy of Sri Lanka through the earnings gained from exporting of coconut and the related products.

1.4.2 Agriculture

The agriculture which is the most dominant source of livelihood in the area is carried out successfully due to the existing irrigation system since the ancient time. The paddy cultivation also becomes successful as a result of availability of water resources such as Inginimittiya tank constructed across Mee oya, Thabbowa tank and Kottukachchi colonization.

1.4.3 Fisheries

The district which has 150 km lengthy coastal line engages in fishing industry in a large scale. Inland fishing also contributes much to the country's economy. The prawn farming (shrimp and crabs) are undertaken adjacent to the Puttalam lagoon and this industry brings a large sums of foreign exchange to the nation.

The dry fish productions are another lucrative venture which takes place in Kalpitya and Vanathawillu area which are surrounded by number of small islands.

1.4.4 Industries

The salt industry is carried out successfully adjoining the Puttalam lagoon which is an ideal place with low rainfall and high evaporation. This has made the spot to become the second largest salt producer in the country.

The cement factory in Puttalam was commissioned due to the abundant deposit of lime stone at Aruwakkadu in Vanathavilluwa division.

Further availability of the raw material for roof tiles and related industry in Wennappuwa and Dankotuwa areas lead the district to contribute hugely for construction industry of the country.

1.4.5 Livestock and Animal Husbandry

There are a large number of livestock farms located in the area. The animal husbandry is commonplace in most of the rural villages, contributing the nutrition of the nation.

1.4.6 Fruits and Vegetables

The vegetable cultivation carried out by using ground water is flourishing in and around Kalpitya division. The cultivation of vegetables such as Beet root, Carrot, Cabbage, Guava, Water Melon, Gherkin, Pumpkin, Tomatoes, Papaws and Dragon fruit contribute to the agriculture sector largely.

It can prevalently be seen the cashew cultivation in Aarachchikkattuwa, Vanathawilluwa divisions and papaw, Orange cultivation in Puttalam, Kalladi, Ralmaduwa and Vanathawilluwa.

1.4.7 Sanctuaries

A large number of tourists from home and abroad visit the country's largest sanctuary in Wilpaththu, the Aanawilunthawa bird sanctuary and the beautiful beach in and around Kalpitya peninsula. The Puttlum district is peculiar in that the world's largest mammals living in the sea and surface can be seen within matters of minutes of flying from Puttlum.

The seas off Kalpitiya Peninsula is known for its large pods of Spinner Dolphins. Sperm Whales traveling on a North-South Axis along the 400m depth contour can be seen in Kalpitya Sea. Blue Whale rare Orca and pelagic seabirds can be sighted offshore of the reef of Kalpitiya.

1.4.8 Tourism

Number of tourist hotels such as Dolphin Club, Ranveli, Pambay hotels have been constructed to facilitate and promote the tourism in the area so that the thriving of the industry brings large sum of foreign exchanges to the nation. Kalpitiya isles are much similar to isles in the Maldives and have great potential for tourist attraction.

Kalpitiya a renowned destination for whale and Dolphin watching enthusiasts is one of the sites that the Government of Si Lanka is promoting for niche market tourists. Activities such as parasailing, scuba diving etc. are already established in the area with several resorts and boutique hotels planned.

An airfield which facilitate operation of small to medium size aircraft for air taxi service, recreational flying, sight scenes and flying training will be an added attraction of tourists to the District.

1.5 Population

The recorded population of Puttalam District is 760,768 (2012) and there were 553,009 (2015) registered voters at the last Presidential Election (2015). The literacy rate of Puttalam is over 95%.

1.6 Administration

The district is divided into five electorate's viz. Puttalam, Anamaduwa, Nattandiya, Wennappuwa and Chilaw and administered through sixteen Divisional Secretariat Divisions. They are Anamaduwa, Arachchikattuwa, Chilaw, Dankotuwa, Wennappuwa, Kalpitiya, Karuwalagaswewa, Mundel, Madampe, Mahawewa, Mahakumbukkadawala, Natandiya, Nawagaththegama, Pallama, Putttalam, and Vanathawilluwa. There are 1,273 villages within Puttalam District which are managed through 548 Grama Niladhari divisions. Eight (08) Member of Parliaments and Seventeen (17) Provincial Council Members are elected for the District.

1.7 Climate

Under the Köppen climate classification, Puttalam has a tropical savanna climate with a short dry season from June to September and a second dry season from January to March. The wet season is mainly from October to December. Temperatures remain steady throughout the year with little variations in between. Average daily temperature varies between 25^0 C and 29^0 C throughout the year. The air contains relatively high humidity (over 70%).

1.8 Transport

Since from the Dutch Rule, Puttalam has a rich transport network. It is the only city in the country which has established roadways, waterways, railways and airways in the past.

Puttalam has three (3) main highways that connect it to major cities in the country. Road A3 connects Puttalam with Colombo via Negombo. Road A10 connects Puttalam with Kandy via Kurunegala. Road A12 connects Puttalam with Trincomalee via Anuradhapura.

Daily bus transport is available to the capital Colombo and other major towns like Kurunegala, Kandy and Anuradhapura.

There is also rail track connecting Puttalam to the rest of cities with daily train services.

1.9 Advantage of an airfield for the North West region

The North western Province is rich in history, diversity in ethnicity and religion. It has potential for development in the agriculture, industries and tourism. It could also capitalize on the sunny skies during major part of the year coupled with flat terrain for promotion of aviation related activities. The type of tourism that is promoted in the area which is more out bound activity oriented could also draw potential investments in aviation sports.

The high-end tourists who are expected to patronize the resorts at Kalpitiya would be more inclined towards shorter travelling time to destination thus an airfield at close proximity will enhance the total outlook of the region.

On the above facts the construction of an airfield in the region initially to cater to a limited domestic market is much recommended.

2 Important consideration in Airfield Development

2.1 Determination of Runway length and orientation

2.1.1 General Factors

Factors affecting the determination of sitting of runway and its minimum length depend largely on the following:

a. Performance characteristics and operating masses of the Design aircraft;
b. Weather, particularly surface wind speed and direction, temperature, humidity and visibility;
c. Runway characteristics such as slope and surface condition; and
d. Aerodrome location factors, for example, aerodrome elevation which affects the barometric pressure and topographical constraints.
e. Soil condition of the site

2.1.2 Runway Length Corrections for Elevation, Temperature and Slope

As stated in 3.1.1, when the appropriate flight manual is not available the runway length must be determined by applying general correction factors.

a. As a first step, a basic length should be selected for the runway adequate to meet the operational requirements of the aeroplanes for which the runway is intended. This basic length is a runway length selected for aerodrome planning purposes which is required for take-off or landing under standard atmospheric conditions for zero elevation, zero wind and zero runway slope.
b. The basic length selected for the runway should be increased at the rate of 7 per cent per 300 m elevation. However, such an increase is not required for Palaviya airfield, as the runway elevation is not more than 21feet.

c. The length of runway determined under (b) above should be further increased at the rate of 1 percent for every 1°C by which the aerodrome reference temperature exceeds the temperature in the Standard Atmosphere for the aerodrome elevation. Since Palaviya airfield average temperate is 15 degrees Centigrade higher than the Standards Atmosphere, 15 % increase of the runway length required under standard temperature is required.
d. Where the basic length determined by take-off requirements is 900 m or over, that length should be further increased at the rate of 10 per cent for each 1 per cent of the runway slope
e. At aerodromes where temperature and humidity are both high, some addition to the runway length determined under (d) may be necessary, even though it is not possible to give exact.

2.2 Design aircraft (Critical aeroplane)

The critical aeroplane is a conceptual aeroplane whose characteristics are a composite of the most critical elements of all the aeroplanes that each aerodrome facility is intended to service. For example, in the design of a runway the critical characteristic determining runway width may derive from a different actual aeroplane than the critical characteristic determining clearance to the parallel taxiway. As movement area design is directly related to the operating characteristics of the aeroplanes for which the facilities cater, it is important that the critical aeroplane be separately determined for each facility.

2.3 Aerodrome Facility Reference Code (Aerodrome Reference Code)

It is a two-element, alpha-numeric notation (for example 1B, 3C) derived from the critical aeroplane for that aerodrome facility. The code number is based on the aeroplane reference field length and the code letter is based on the aeroplane wing span and the outer main gear wheel span.

The aerodrome reference code provides a method of grouping aeroplanes with different characteristics (e.g. wing span, outer main gear wheel span, approach speed and all-up mass) which behave similarly when landing, taking-off or taxying. This, in turn, enables standards for aerodrome facilities such as runways to be set in terms of a small number of aeroplane groups, rather than individually for a large number of separate aeroplanes.

As the aerodrome reference code notation is derived from aeroplane and not aerodrome characteristics, it applies to the individual aerodrome facilities (e.g. runways and taxiways) and indicate their suitability for use by specific groups of aeroplanes. Thus at the same aerodrome there may exist, for example, a code 4E runway, a code 1A runway, a code C taxiway and a code 2 runway strip. ..

In many cases to determine the appropriate design standard for an aerodrome facility, it is necessary first to identify the aeroplanes for which the facility is intended, and then to determine the aerodrome reference code notation for the most critical of these aeroplanes. The particular standard for the facility is then related to the more demanding of the two criteria (the number or the letter) or to an appropriate combination of both.

The following table gives Numeric Code for some aircraft

Code number	Aeroplane reference field length	Typical aeroplane
1	< 800 m	DE HAVILLAND CANADA DHC-6/PIPER PA-31
2	800 m but < 1200 m	ATR42/BOMBARDIER Dash 8 Q300

Code number	Aeroplane reference field length	Typical aeroplane
3	1200 m but < 1800 m	SAAB 340/BOMBARDIER Regional Jet CRJ-200
4	1800 m and above	BOEING 737-700/AIRBUS A-320

Figure 1-Runway Reference - Numeric Code

The following table gives the Alphabetic code for the runway

Code letter	Wingspan	Outer main gear wheel span	Typical aeroplane
A	< 15 m	< 4.5 m	PIPER PA-31/CESSNA 404 Titan
B	15 m but < 24 m	4.5 m but < 6 m	BOMBARDIER Regional Jet CRJ-200/DE HAVILLAND CANADA DHC-6
C	24 m but < 36 m	6 m but < 9 m	BOEING 737-700/AIRBUS A-320/EMBRAER ERJ 190-100
D	36 m but < 52 m	9 m but < 14 m	B767/AIRBUS A-310
E	52 m but < 65 m	9 m but < 14 m	B777/B787 Series/A330
F	65 m but < 80 m	14 m but < 16 m	BOEING 747-8/AIRBUS A-380-800

Figure 2-Runway Reference - Alphabetic Code

3 Development of an Airfield for Puttalam

There is no data or information relating to demand for air travel into and out of Puttlum area. However, if the airfield is developed, it is expected to generate some traffic initially in view of the social and economic activities and potential activities involving tourism as stated under paragraph 1 above.

The air distance between Puttalam and BIA is 95 km which can be flown within 30 minutes by a medium size aircraft. Such means of expeditious accessibility between Puttalam and BIA will really help attraction of tourists who have liking to Maldives beaches to Kalpitiya area.

Since the Puttalam area is comparatively dry throughout the year, airfield is very much conducive for promotion of general aviation which includes training flights, scenic flights, pleasure flying etc.

It will also help integration of the North Western Province with the rest of the domestic airfields, contributing to wide connectivity by air.

3.1 Design Aircraft

It is proposed that the airfield in Puttalam District is designed to handle ATR-42 aircraft (42 seater) which has the following basic characteristics. The ATR 42 is a twin-turboprop, short-haul regional airliner built in France and Italy by ATR. ATR models have their final assembly in Toulouse, and share resources and technology with Airbus. Unit cost of ATR is USD 12,–19 million (2012). Some of its vital performance data is as follows.

Maximum Take-Off Weight (MTOW)	- 18,600 kg (41,005 lb.)
Max payload (at typical in-service OEW)	- 5,300 kg (11,684 lb.)
Take Off Distance Required – at Basic (MTOW - ISA - SL)	- 1,165 m (3,822 ft.)
Passengers	- 48 (30” pitch)

Runway Reference code - 2C

3.2 Justification for ATR 42 aircraft

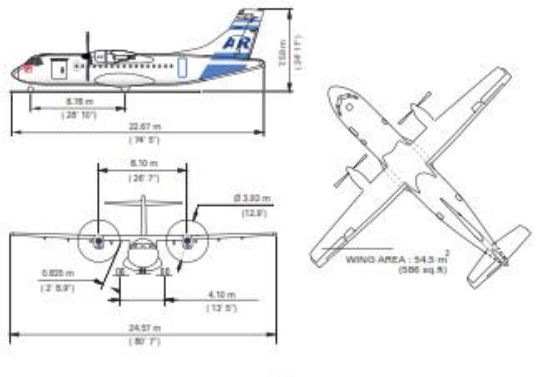
Since commencement of production in 1981, as at 31 December 2014, ATR had delivered 1190 aircraft (436 ATR 42s and 754 ATR 72s) and it has become most popular aircraft in South Asia Region. Technical crew and maintenance support is readily available on competitive pricing.

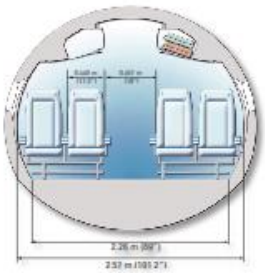
ATR aircraft are equipped with the most advanced technological innovations so that they always remain at the cutting edge of modernity, performance and reliability. It is so versatile that within a very short period, the operator can change configuration of aircraft from all passengers to all cargo and vice versa. Such an aircraft will facilitate transport of cargo including perishables that are produced in Puttalam Area.

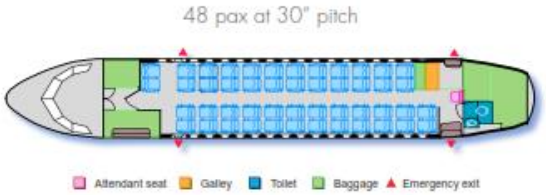
A new engine - the PW127N - has been certified, bringing with it 4.5% additional take-off power and thereby increasing aircraft performance in hot weather and at altitude. The aircraft is in production and technical support is readily available to the user.

3.3 ATR Characteristics

ATR 42-500 ATR 42-500







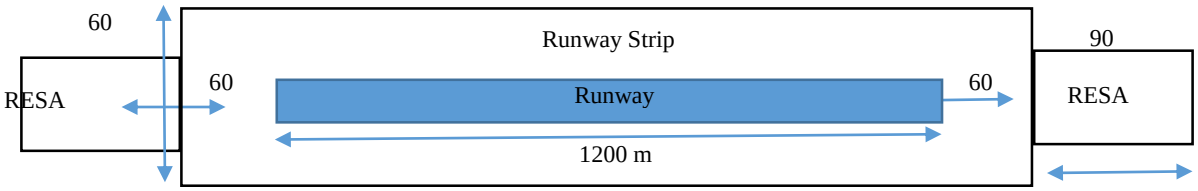
Standard configuration	48 seats
Engines Pratt & Whitney Canada	PW127E/M
Take-off power	2,160 SHP
Take-off power - One engine	2,400 SHP
Max continuous	2,400 SHP
Max climb	2,160 SHP
Max cruise	2,132 SHP
Propellers Hamilton Standard	568F
Blades, diameter	6, 3.93 m - 12.9 ft
Weights	
Max take-off weight (basic)	18,600 kg - 41,005 lb
Max landing weight (basic)	18,300 kg - 40,344 lb
Max zero fuel weight (basic)	16,700 kg - 36,817 lb
Max zero fuel weight (Option)	17,000 kg - 37,478 lb
Operational empty weight (Tech. Spec.)	11,250 kg - 24,802 lb
Operational empty weight (Typical in-service)	11,700 kg - 25,794 lb
Max payload (at typical in-service OEW)	5,300 kg - 11,684 lb
Max fuel load	4,500 kg - 9,921 lb
Airfield performance	
Take-off distance	
• Basic - MTOW - ISA - SL	1,165 m - 3,822 ft
- TOW for 300 Nm - Max pax - SL - ISA	1,025 m - 3,363 ft
- TOW for 300 Nm - Max pax - 3,000 ft - ISA +10	1,215 m - 3,986 ft
Take-off speed (V2 min @ MTOW)	112 KCAS
Landing field length (FAR25)	
- Basic MLW - SL	1,126 m - 3,694 ft
- LW (max pax + reserves) - SL	1,055 m - 3,461 ft
- Reference speed at landing	104 KIAS
En-route performance	
Optimum climb speed	160 KCAS
Rate of climb (ISA, SL, MTOW)	1,851 ft/min
Time to climb to FL170	12.7 min
One engine net ceiling (95% MTOW, ISA +10)	13,010 ft
Max Cruise speed (95% MTOW - ISA - Optimum FL)	300 KTAS - 556 km/h
Fuel flow at cruise speed	811 kg/hr - 1,788 lb/h
Range with max pax	716 Nm
200 Nm Block Fuel	565 kg - 1,246 lb
200 Nm Block Time	54.0 min
300 Nm Block Fuel	783 kg - 1,726 lb
300 Nm Block Time	75.0 min

3.4 Runway

In order to accommodate the Design aircraft (2C aircraft – i.e. ATR-42), a runway with following characteristics is required.

Length - 1,200 m
Width - 30 m

A Runway Strip and a Runway End Safety Area (RESA) should be established as per ICAO requirements as below;



3.5 Runway End Safety Area (RESA)

In accordance with the ICAO Standards there should be a Runway End Safety Area of 90 m long and 60 m wide for a 30 m wide runway. This area should be an obstacle free area.

3.6 Total Length required for the Runway

As stated above, the total length of land area required for a runway will be 1500 m as specified below;

Length of the runway	- 1,200 m
Length required for the Runway Strip for two ends of the Runway	- 60mx2 = 120 m
RESA for both Runway ends	- 90x2 = 180 m
Total length required	- 1,500 m

3.7 Taxiway

A 23 m wide taxiway connecting the runway to an appropriate apron needs to be constructed.

3.8 Apron

An apron has to be constructed initially to handle a low capacity of traffic but with adequate area for expansion.

3.9 Runway lighting

In order to ensure effective use of the runway both day and night, the runway lighting needs to be installed and use of solar power for runway lighting would bring the maintenance cost down.

3.10 PBN approaches

It would be expedient to provide the air field with PBN approach procedures so that aircraft equipped with required navigation equipment can use the airfield even under low visibility conditions.

3.11 Total Land Area

In order to develop an airfield to accommodate the basic facilities as explained above an area of 40 hectares (100 acres) would be required.

4 Palaviya Airfield

4.1 Location

Palaviya Airfield is situated in a block of land of 125 hectares (310 acres) in extent on the Palaviya - Kalladiya Road around 3.2 km away from the Palaviya Junction which is located around 130 km from Colombo Fort on the Colombo – Puttalam main road (A3), in the Puttalam District. Its geographical coordinates are 07^0 58' 45.45" N, 079^0 51' 21.76" E. The distance between Palaviya Airfield and Puttalam town is 9 km.

4.2 Distance to other airfields by air

Palaviya airfield is the only airfield located within the North Western Province. The distance between Palaviya airfield and rest of the airfields in Sri Lanka is as shown in the Table below. Although there are number of airfields located in the east coast, Puttlum is the only northwards airfield in the west coast passing BIA.

Ampara	Ampara															
Anuradhapura	170	Anuradhapura														
Batticaloa	41	153	Batticaloa													
Hindurakgoda	107	67	86	Hindurakgoda												
Iranative	266	120	235	162	Iranative											
Kankasanturai	323	171	292	218	57	Kankasanturai										
Katukurnda	202	201	227	200	317	361	Katukurnda									
Katunayake	193	138	206	155	251	292	71	Katunayake								
Koggala	209	257	242	241	377	424	73	141	Koggala							
Mattala	130	237	169	197	354	407	129	169	94	Mattala						
Puttlum	212	72	206	126	161	196	166	95	234	241	**Puttlum**					
Ratmalana	200	175	220	182	290	331	32	40	104	148	135	Ratmalana				
Sigirya	118	53	105	27	164	218	179	130	224	190	102	159	Sigirya			
Trincomalee	143	87	108	59	129	185	258	208	299	251	159	239	80	Trincomalee		
Vaunia	199	49	173	93	73	127	250	186	306	281	107	224	92	78	Vaunia	
Weerawila	128	245	168	202	360	414	143	181	105	14	251	162	196	254	288	Weerawila

Figure 3- Air Distance between domestic airfields in Sri Lanka

4.3 History of the airfield

During days of World War II (1939), the British Royal Navy's Fleet Air Arm had established a number of land-based air stations in jungle clearings in Sri Lanka, then Ceylon. They were to support air operations against the Japanese in the Indian Ocean and the Pacific theatre of war. One of them was HMS Regolia at Palaviya near Puttalam.

An Elephant towing a fighter aircraft, near Kalpitiya, Ceylon #IMG253

Initially, summer field strip tracking (or porous metal sheets) were used on the otherwise muddy airfield where Corsair fighter aircraft often got stuck. Elephants had to be deployed, using a collar around their neck attached to the under carriage through a belt, to pull parked aircraft to the runway to carry out sorties.

However, the 'PSP' metal sheets that made up the runway surface initially are no longer to be found and replaced by a paved strip.

4.4 Airfield Dormancy

The airfield was regularly used for civil aircraft operations for number of years up to 1985 under the control of the Department of Civil Aviation. It was identified to be an emergency landing pad for aircraft operated between Ratmalana and Palaly and vice versa.

However, the use of the airfield had to be abandoned for civil operations with the commissioning of Puttalam Cement Factory which projects up a tall chimney at a distant of only 1000 feet away on the extended centreline of the runway. The chimney creates a major obstacle for safe operation of fixed wing aircraft.

4.5 SLAF Occupation

In 2000 Sri Lanka Air Force established its No.05 Air Defence Radar Squadron. The purpose then was twofold - to provide support to the adjoining firing range at Kalpitiya where gunnery training was carried out and to use it as a staging area for specific air operations.

4.6 Current use

The airfield is hardly used for any fixed wing operations. However, there have been an average of two helicopter movements per month into the airfield.

4.7 Present Status

4.7.1 Runway

The runway is 1,100 m long and 30 m wide. It is oriented in the North Easterly (048^0) and South Westerly (228^0) direction. However, the runway is at present in a derelict condition, that it cannot be used for aircraft operations, without improvement of the surface conditions.

4.7.2 Taxiway & Apron

The airfield is not provided with a properly done up Taxiway and Apron.

4.7.3 Terminal Building

The airfield is not provided with a Terminal Building capable of accommodating passengers.

4.7.4 Obstacles in the vicinity

It was noted that the presence of following major obstacles in the vicinity of the Aerodrome have crippled the use of airfield for civil aircraft operations;

1) The chimney of the Holcim Cement Factory at Puttalam is located approximately 960 m on the extended centreline of the runway from the 23 threshold (north easterly end). The height of the chimney is approximately 60 m. It penetrates the approach surface of the runway 23. This is a safety hazard and is identified to be the major impediment for the use of the airfield as it is and also for further development of this aerodrome.

2) SLAF Antenna Mast which projects a height of 76.2 m is located 300 m north of the runway. This antenna mast which penetrates the Transitional Surface of the Obstacle Limiting Surfaces to be established for the runway, will also be a major obstruction for safe operation of aircraft. The Mast will also be a major obstruction for air traffic operating in the right hand circuit for runway 23 and left hand circuit for runway 05 (See the diagram below).

5 Feasibility of Development of Palaviya Airfield

5.1 Runway Orientation

In view of the obstructions stated at para 2.7.4, for the airfield to be effectively used, sitting of the runway will have to be re-oriented in such a way that the chimney will be outside the approach surface of the runway 23, unless the chimney of Holcim factory is removed, which is considered to be impractical. For this purpose, the runway orientation needs to be changed at least by 12^0 clockwise or anticlockwise after studying the predominant wind pattern.

Option 1 – Rotating the Runway by 12^0 Northwards (anti clockwise)

If the runway orientation is rotated by 12^0 anticlockwise, the obstruction created by Holcim Chimney will conform to one side of the extended centre line of the runway and the SLAF Antenna Mast on to the other side of the runway (Refer the diagram below).

Accordingly the two erections will be obstacles for aircraft operating in both circuits (one obstacle for the Left hand Circuit and the other obstacle for the Right hand Circuit) of the runways. Hence the option-1 does not help address the problem of avoiding obstacles.

The diagram below shows the Existing runway, Proposed Runway, SLAF Antenna Mast, Chimney of the Cement Factory and two Traffic Circuits.

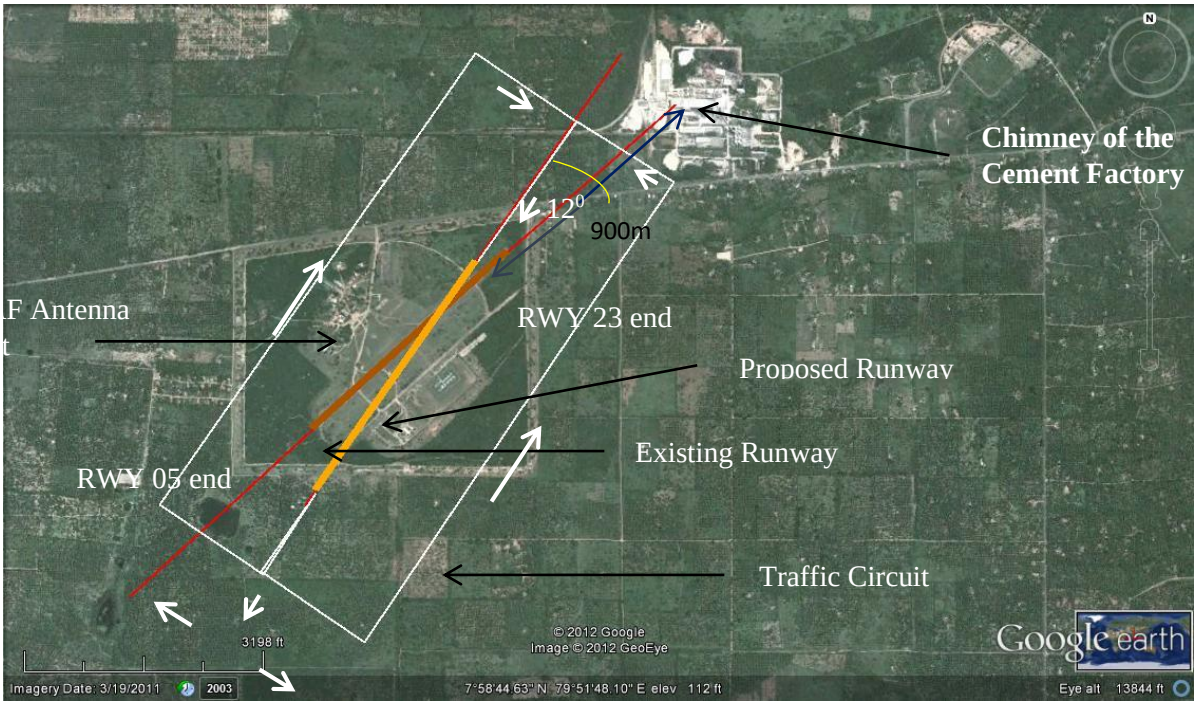


Figure 4 - Location of obstacles in relation runway if turned anticlockwise

Option 2 – Rotating the Runway by 12^0 to the South (clockwise direction)

If the runway orientation is rotated by 12^0 to clockwise, Holcim chimney and the SLAF Antenna Mast will conform to a single side of the runway/extended centre line of the runway (Refer the diagram below) and two erections will have effect on aircraft operated only in one circuit and the other circuit will be clear of obstacles.

As such as far as the need of avoiding existing obstacles are concerned Option -2 will be the most preferred option for the new orientation of runway. However, prior to taking any decision for change of orientation of the runway, a detailed study of wind pattern of the area should be done as the runway should normally be oriented in the direction of predominant wind.

The diagram below shows the existing runway, Proposed Runway, SLAF Antenna Mast, Chimney of the Cement Factory and two Traffic Circuits.

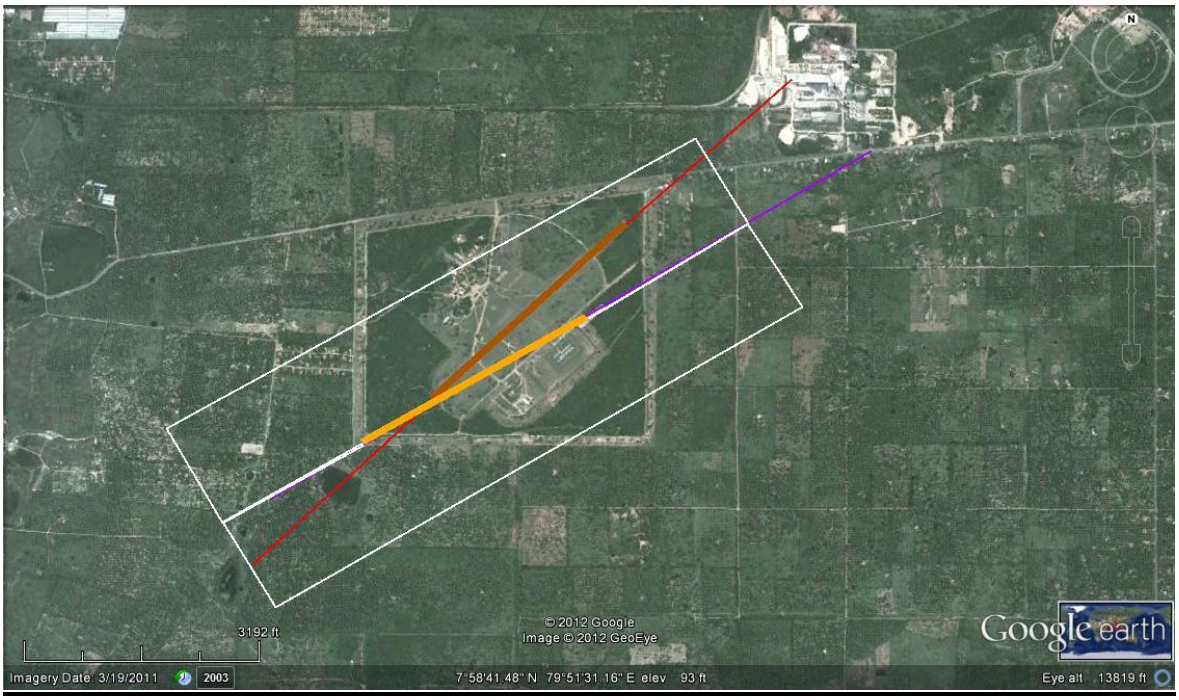


Figure 5- Location of obstacles in relation runway if turned clockwise

5.2 Terminal Building

A terminal building with necessary facilitation for passenger handling needs to be designed and constructed to accommodate an adequate number of passengers.

5.3 Wind Pattern in Palaviya

In order to ascertain the possibility of turning the direction of the runway to avoid obstacles as explained above, Department of Meteorology was consulted to obtain wind data of the area for a period of ten (10) years.

Wind statistics provided by the Meteorological Department for Puttalam Town for the period 2003 - 2014 shows a trend of North North East (NNE) and South South West (SSW) winds. Refer attachment 1 for diagrams of wind rose.

This wind distribution supports the runway orientation to be established in a NNE/SSW direction.

However under the option 2 mentioned above requires the runway orientation to be rotated southwards by 12^0 which is more towards to ENE/WSW. Wind data provided by Department of Meteorology had been collected in the morning and evening hours and therefore the average speed of the wind during the day time is assumed to higher than the wind speed used for this study.

Accordingly Option 2 will no longer be the preferred option as the runway will predominately experience a crosswind component which is not recommended for operation of light aircraft with shorter runways.

5.4 Further considerations and limitations

During the study for development of Palaviya airfield, it is observed that it is only the availability of government land which is dedicated for an airfield which can be considered positively in the

development of an airfield for Puttalam District. The entire infrastructure for an airfield has to be established afresh much similar to development of a Greenfield airport due to the following reasons.

a. The present infrastructure at Palaviya airfield which is a SLAF base and which has sensitive security equipment at its precincts cannot be used for civil aviation purposes in its present form due to the obstacle on the approach path and the unacceptable status of the runway and associated facilities.
b. The development to the airfield will involve entire construction of a runway and associated facilities rather than the development of the existing infrastructure.
c. The wind patterns in the given area is more towards southerly direction from of the present orientation and therefore in keeping with the technical concepts the orientation should be rotated into an anti-clock wise direction from the present.
d. The need to change the orientation due to the Holcim chimneys, by at least 12^0 clockwise though provides an unimpeded approach path would be contrary to orienting the runway according to the prevalent wind patterns in the area.
e. The restrictions specified in paragraph 4.4.4 will continue to restrict aircraft to one side of the airfield and pose restriction in the further developing of the runway and/or upgrading to a status of fully equipped aerodrome catering to all weather conditions (Instrument and visual conditions)
f. Even for the development of airfield with re-orientation of the runway, additional land is required which has to be acquired.
g. Airfield site is presently occupied by SLAF and used for providing vital sensitive national security services and hence free use of the airfield by civil community has to be restricted which is viewed to be negative point in its potential use for civil aviation.
h. It is a waste of public funds if the airfield infrastructure after development will not support free and effective use airspace around the airfield and confine only to use of airspace on one side of the airfield.

5.5 Overall Assessment on the feasibility of Palaviya Airfield

In view of the points stated at paragraph 5.3 and 5.4, investment of public funds for the development of Palaviya is not feasible due to limited scope of use of the airfield even after development and lack of space and opportunity for further expansions in the future.

It is also doubtful whether there would be any investor who would opt to invest in development of an airfield with the serious operational limitations under a PPP model.

Hence, the idea of deployment Palaviya airfield should be dropped completely and instead, attention should be focused for development of a completely new airport devoid of any airspace limitations and restrictions on a government land in the area. Such an investment will bring value to money being spent, better benefits and more opportunities for the area.

6 Development of a Greenfield airfield

The points mentioned in paragraph 7 explain the limitations that the Palaviya airfield has, though the initial land area is available for the development of the airfield. Hence it is recommended that a suitable land is found for development of an airfield devoid of any airspace restrictions for unimpeded operation of aircraft.

6.1 Proposed New Location at Kalladi

In deciding a new location whilst adhering to the aviation requirements the need for the airfield to be accessible by road transport and close accessibility from the Kalpitiya archipelago was considered.

Taking into consideration aviation and socio economic facts in locating a suitable land area within the region the land area East of Colombo Puttalam highway and bordering Wanathwilluwa forest reserve has been suggested by the Divisional Secretary Puttalam as a potential area that can be made available for establishing an airfield.

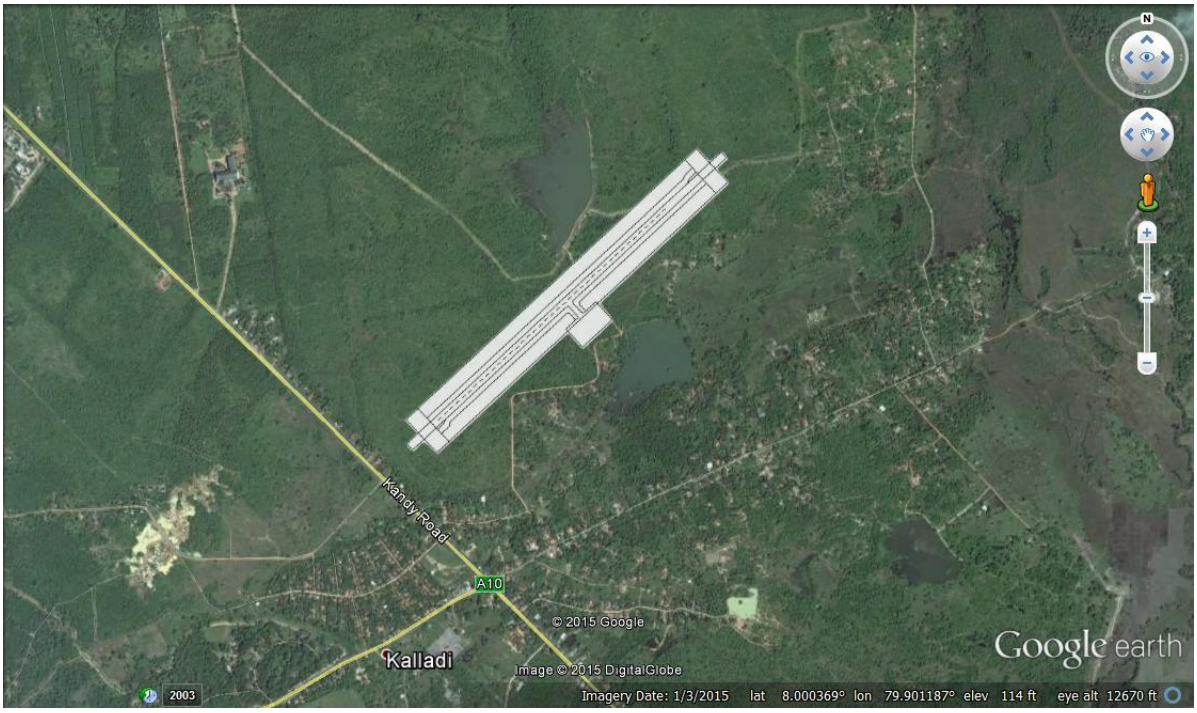


Figure 6- Proposed site for location of airfield at Kalladi

6.2 Land extent required

It is expected that an area of 40 hectares (100 acres) would be needed for the development of an airfield which is capable of accommodating the Design aircraft mentioned at paragraph 4.1

6.3 Effect on Demography

According to Divisional Secretary, Puttalam, the proposed area is abutting a block of land that had been earmarked for allocation to BOI for establishment of Investment Promotion Zone. The proposed area does not have any religious or public places or community centres. As per the studies done with the aid of Google Satellite geo maps, it is a bare land and not causing any disturbance to neighbourhood.

6.4 Estimated Cost of Development

Cost of construction of the runway was estimated based on the following assumptions

- The Design Aircraft will be ATR 42 which requires 2C runway
- Runway length will be not more than 1,200 m with a width of 30 m.
- There would not be any cost for land acquisition or payment of compensation to any party.

In the absence of national standards relating to estimation of costs of development of airfields, planning data given by FAA is used to estimate the cost of development of the airfield. Accordingly rates given in the chart below is used for development of the cost estimate

Asphalt	Cost
General Aviation (2,000 to 4,000 foot runway, typical length: 3,700 ft. 12" depth: 4" asphalt concrete + 8" base)	
Runway Construction (New, 75' width)	$1,200 per linear foot
Taxiway Construction (New)	$16 per square foot
Ramps/Apron Construction (New)	$16 per square foot
Terminal Structure (New)	$250 per square foot
Resurfacing (3", 75' width)	$200 per linear foot

Figure 7- Cost estimates for airfield development

Technical Note: Runway construction costs include paving, grading (2' fill), lighting, marking, turfing and minimal drainage within the runway safety area.

Facility	Dimensions	Total Area	Rates (USD)	Total Cost (USD)
Runway	1,200 m X 30 m	36,000 m^2	3,936 per 1 linear m	4,723,200/=
Taxiway	15 m X 30 m	450 m^2	172 per 1 m^2	77,400/=
Apron	100 m X 100 m	10,000 m^2	172 per 1 m^2	1,720,000/=

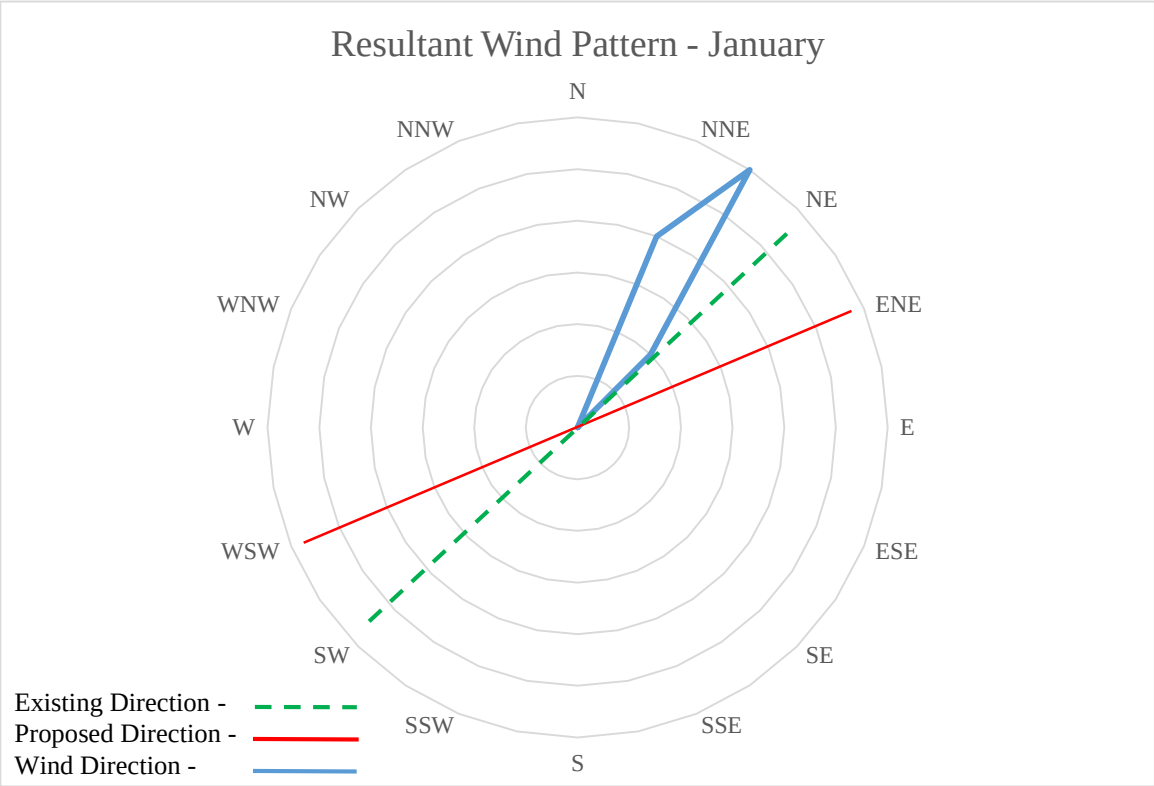
Accordingly, the cost of construction of a runway, taxiway and apron will cost USD 4,972,600/= (Rs. 720 million approximately. The cost of construction of terminal building with basic facilities and a floor area of 700 m^2 will cost Rs.20 million. Accordingly, the total cost of construction of an airfield with 2C code runway (1,200 m length and 30 m width) is estimated to be Rs.750 million.

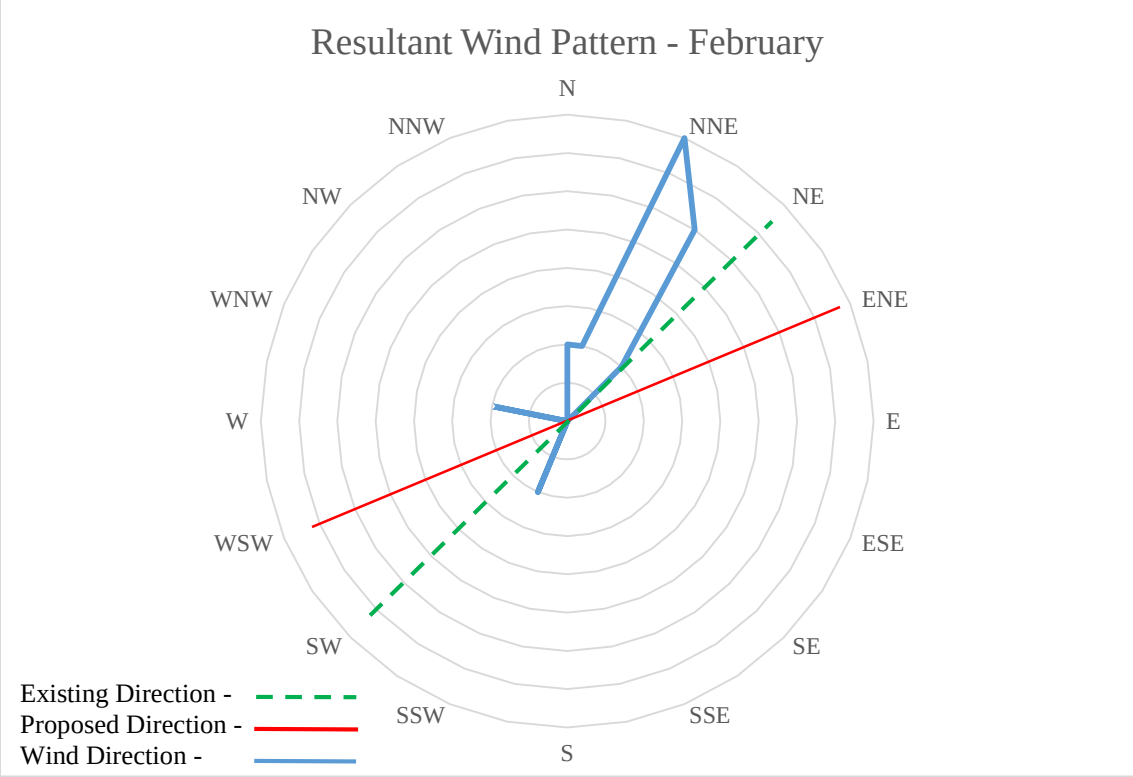
6.5 Environmental Impact Assessment

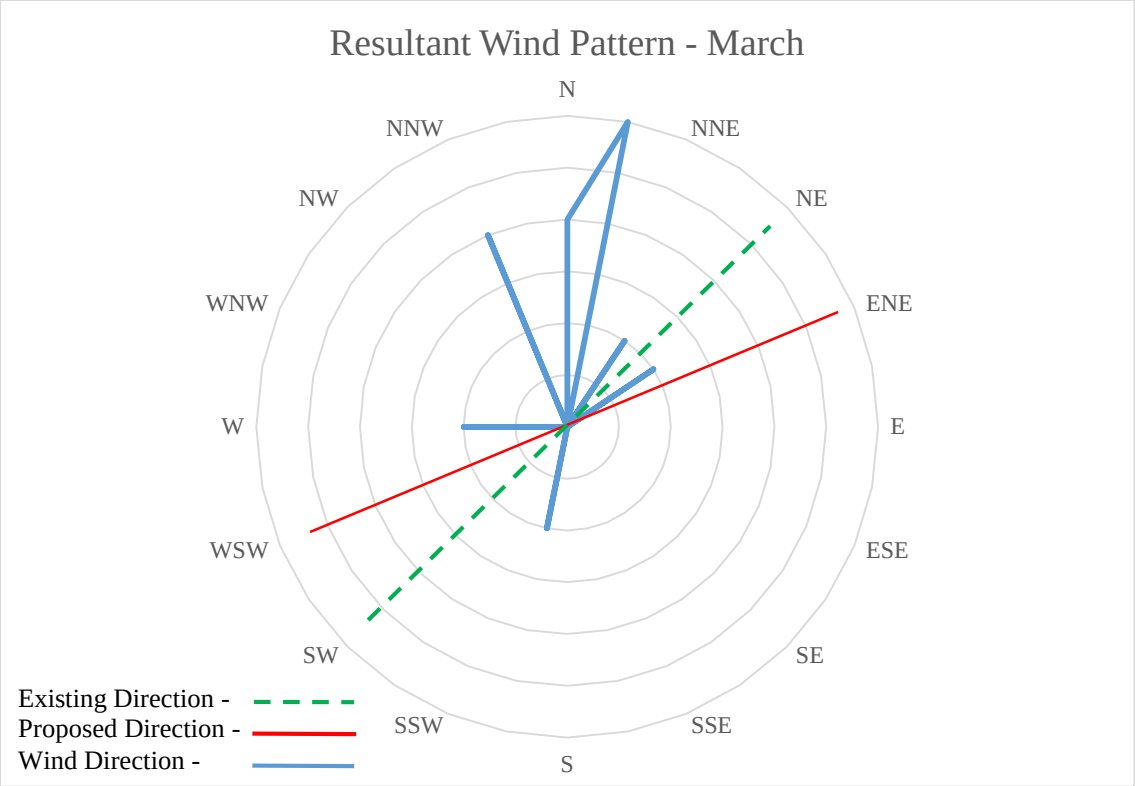
If the proposal is accepted and decision is taken to proceed, an Environmental Impact Assessment should be carried out and approval from the Central Environmental Authority should be obtained prior to start planning and construction of the airfield.

- End -

Attachment 1 – Resultant Wind 2003-2014






Resultant Wind Pattern - March
N
NNE
NE
ENE
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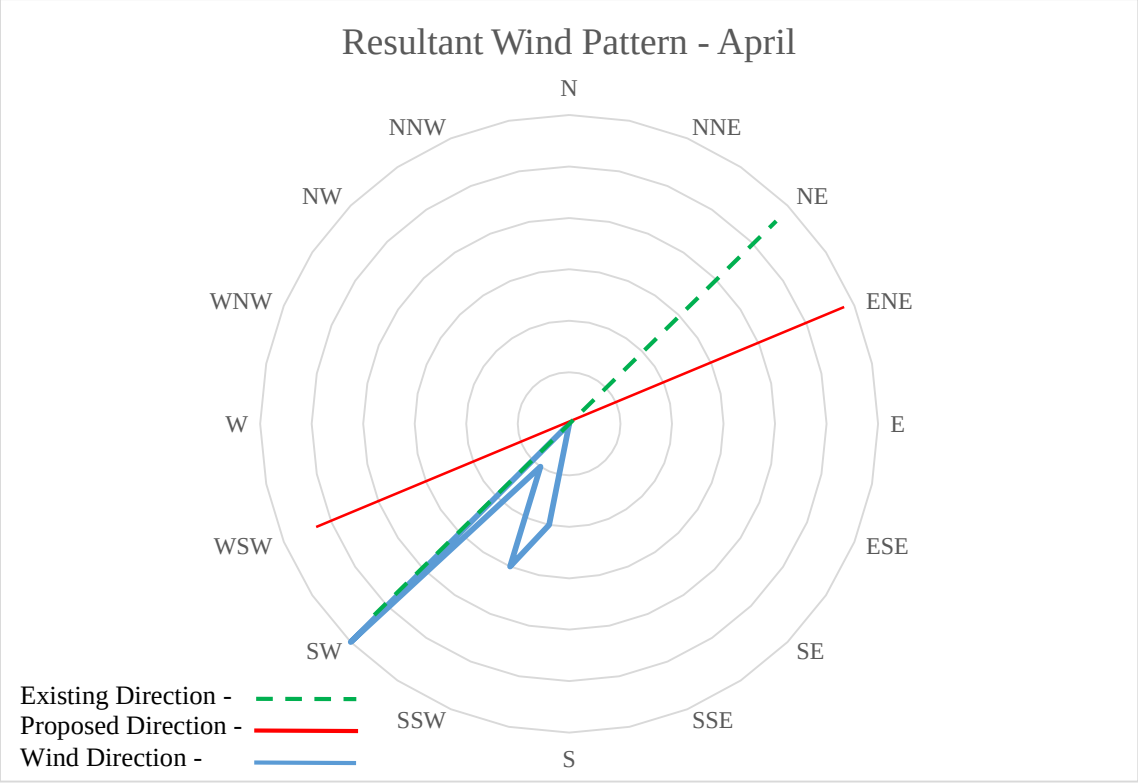
NNW
Existing Direction -
Proposed Direction -
Wind Direction -


Resultant Wind Pattern - April
N
NNE
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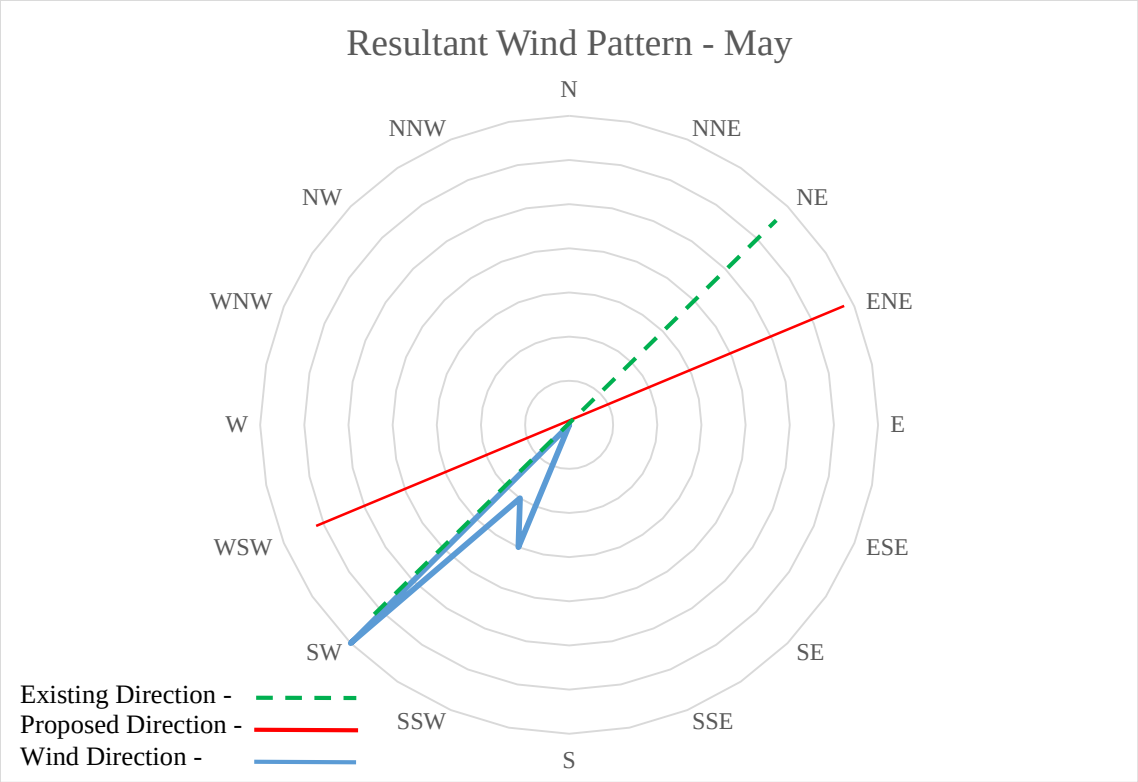
Existing Direction -
Proposed Direction -
Wind Direction -


Resultant Wind Pattern - May
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WNW
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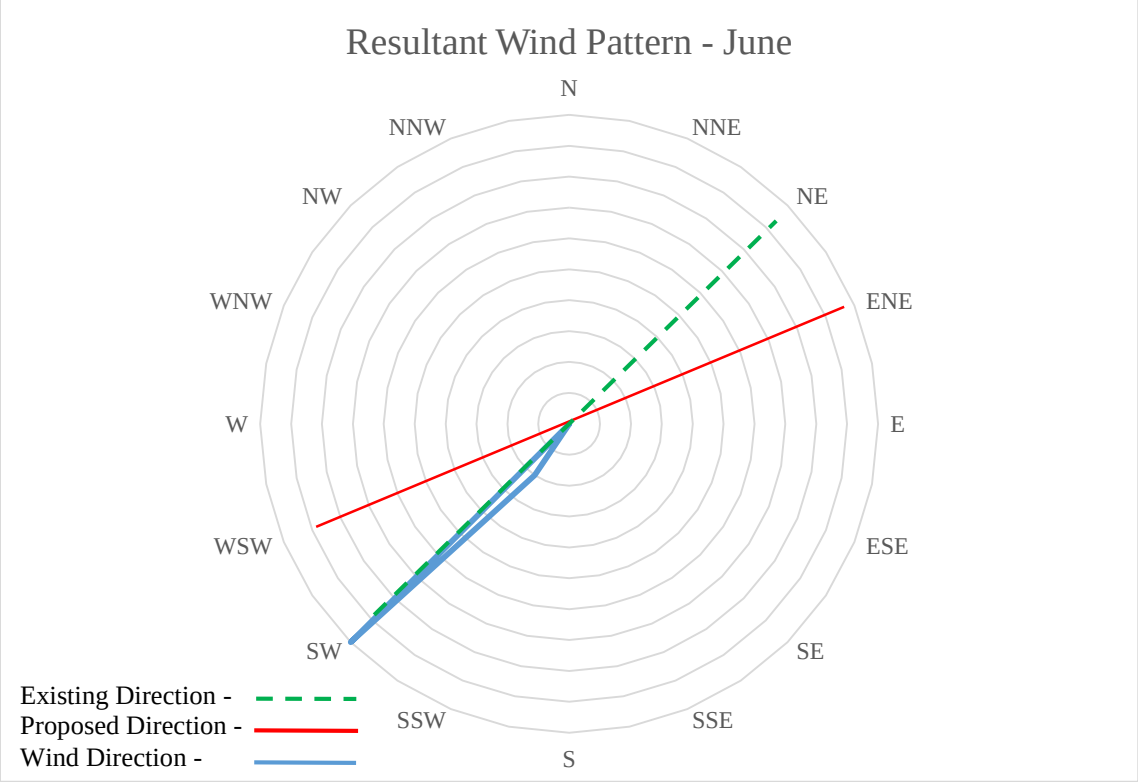
NNW
Existing Direction -
Proposed Direction -
Wind Direction -


Resultant Wind Pattern - June
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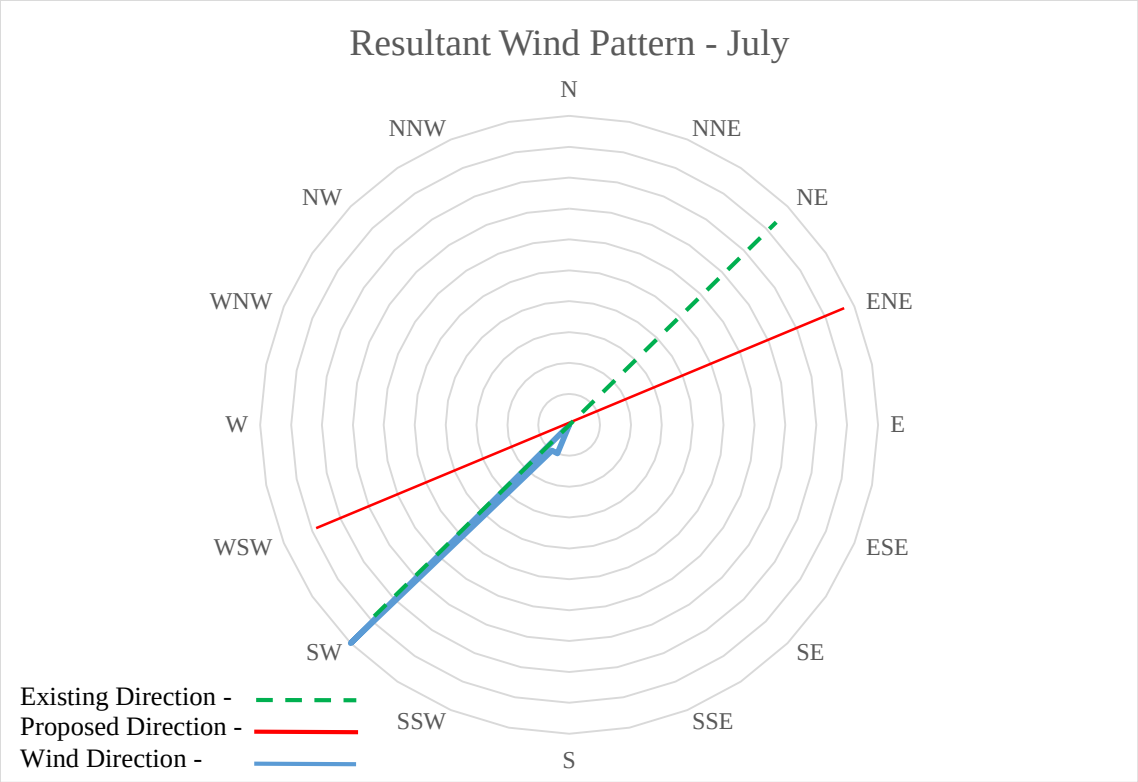
Existing Direction -
Proposed Direction -
Wind Direction -


Resultant Wind Pattern - July
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NNE
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ENE
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WNW
NW
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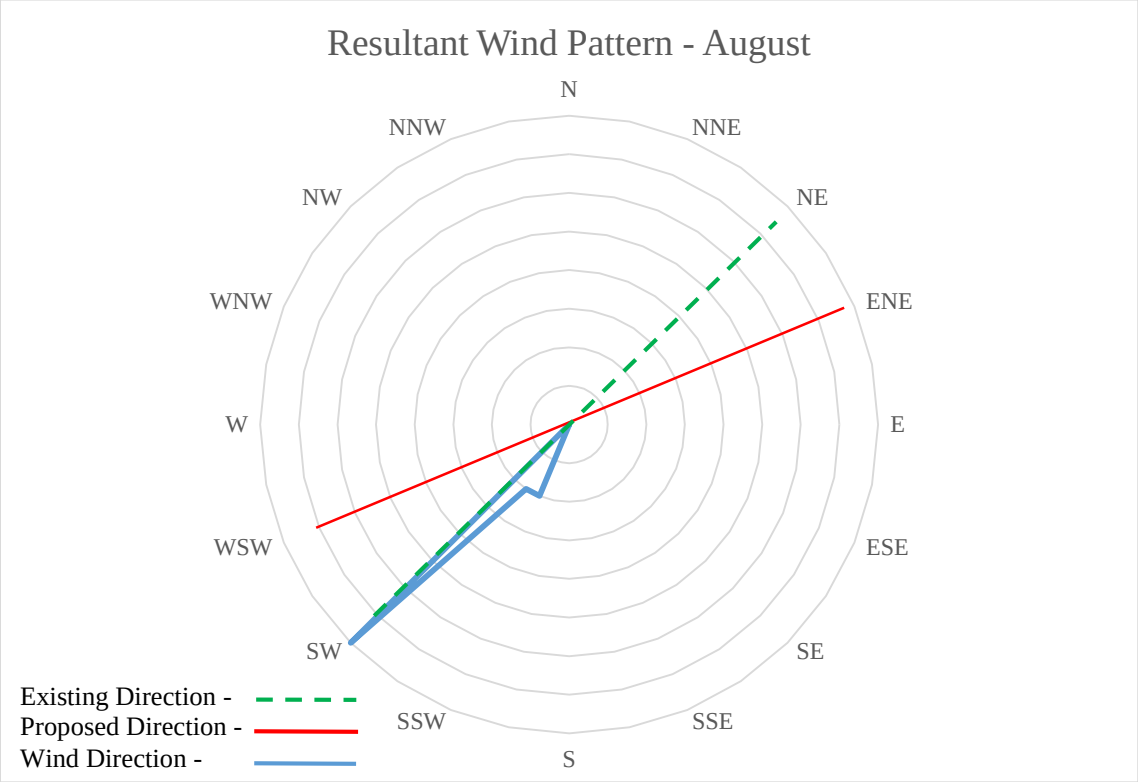
Existing Direction -
Proposed Direction -
Wind Direction -


Resultant Wind Pattern - August
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ENE
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WSW
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WNW
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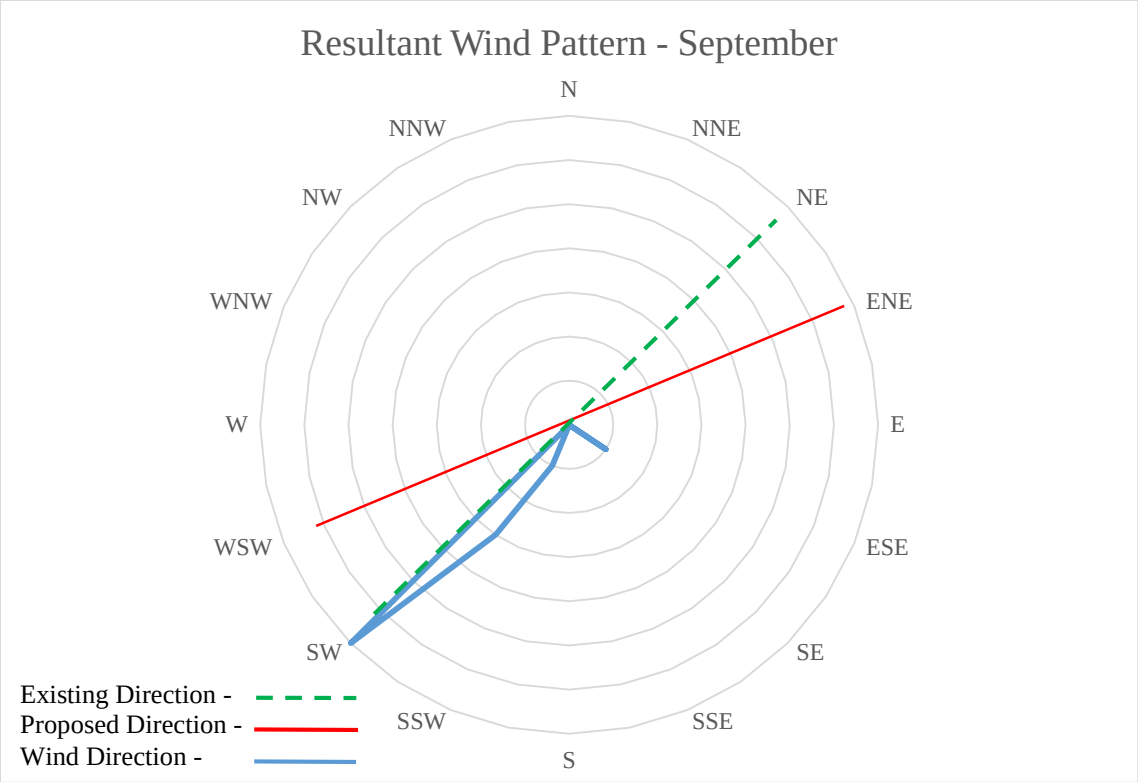
NNW
Existing Direction -
Proposed Direction -
Wind Direction -


Resultant Wind Pattern - September
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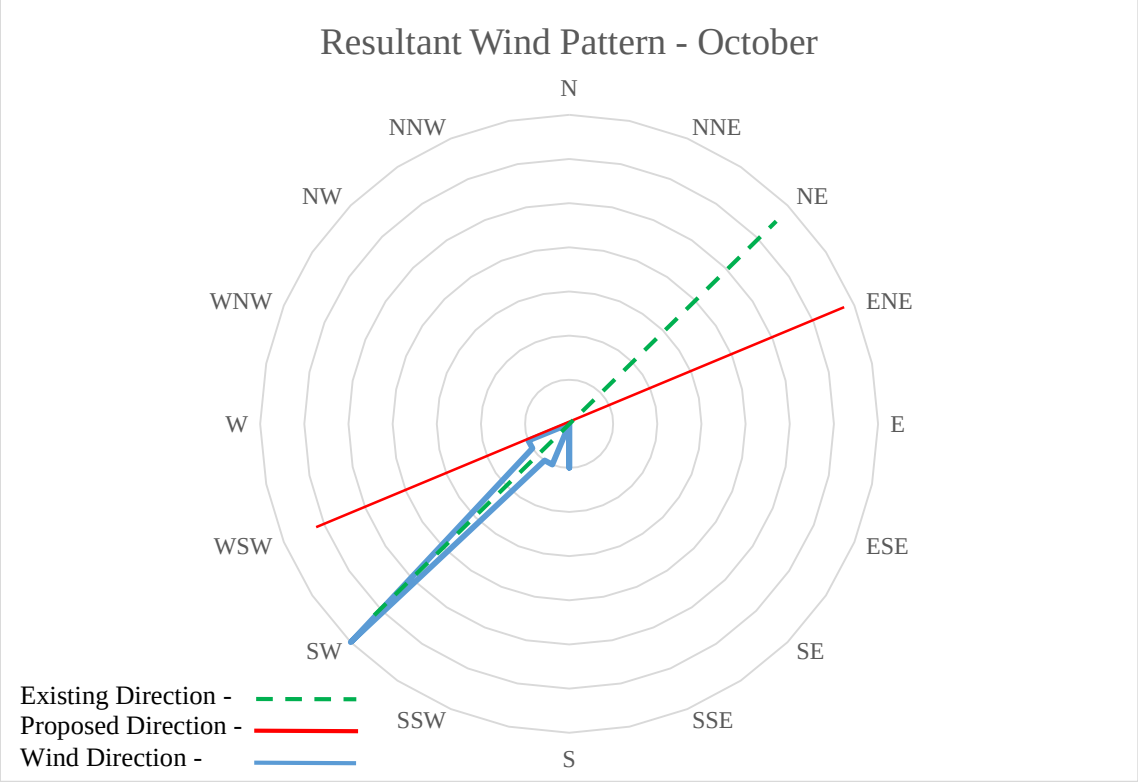
Existing Direction -
Proposed Direction -
Wind Direction -


Resultant Wind Pattern - October
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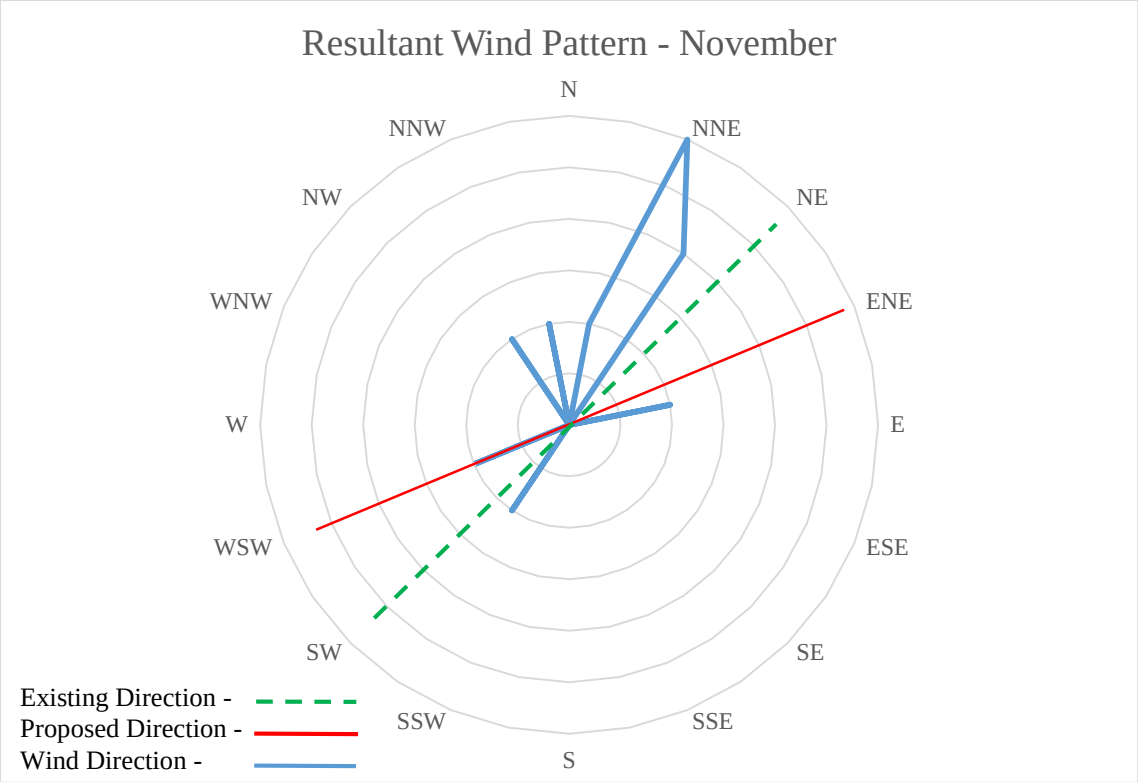
Existing Direction -
Proposed Direction -
Wind Direction -


Resultant Wind Pattern - November
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ENE
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ESE
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SSE
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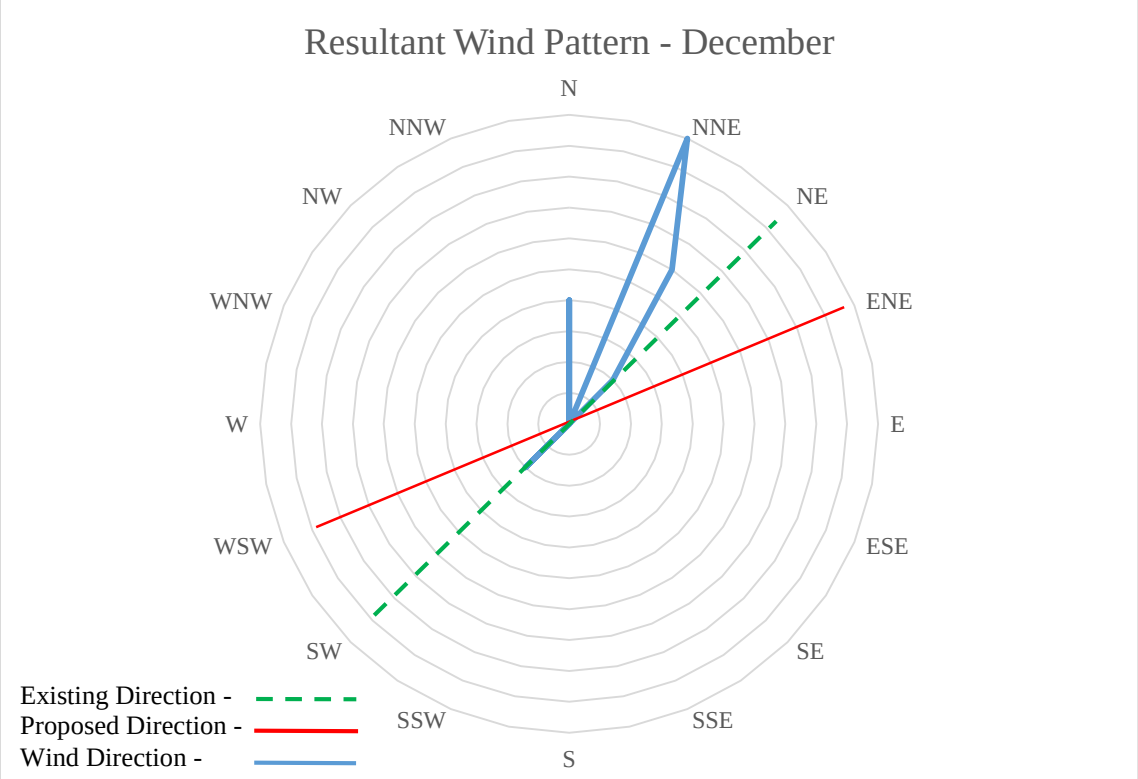
SSW
SW
WSW
W
WNW
NW
NNW
Existing Direction -
Proposed Direction -
Wind Direction -


Resultant Wind Pattern - December
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NNE
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ENE
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ESE
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SSE
S
SSW
SW
WSW
W
WNW
NW
NNW
Existing Direction -
Proposed Direction -
Wind Direction -