Clonsilla – M3 Interchange Railway Line

Feasibility Study

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Iarnród Éireann

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EXECUTIVE SUMMARY

Background

In 1963 the former Clonsilla to Navan railway was closed down after eighty five years. In recent years it has become the subject of a number of different reports and studies as increasing pressure has been applied to reopen the route. The rapidly growing commuter belt is a driving force behind the arguments to reopen the line.

The Strategic Rail Review of 2003 (Booz, Allen, Hamilton) came to the conclusion that there was no economic case for reopening the entire line to Navan. The shorter section of Clonsilla to Dunboyne(M3) was not considered at that time but is the focus of this report. This feasibility study was undertaken with the support of Meath and Fingal County Councils and the Dublin Transportation Office.

Feasibility Study

This study assesses the feasibility of reopening the line addressing any issues and problems that might prohibit the project and examines broadly the cost of the undertaking. An assessment of the operating costs, the demand and possible revenue yield and the operational feasibility and possible service options were addressed to enable a financial and economic assessment to be undertaken.

To assist in assessing the feasibility of the project a number of reports were commissioned externally– preliminary environmental impact assessment, structural study and surface water study. These highlighted potential risk areas to the project, which could then be assessed for their impact on the project. Further detailed reports will be required to tease out these issues at detailed design stage should the project be progressed to the next stage. These reports and other Iarnród Éireann internal reviews enabled the engineering and technical assessments to be undertaken.

Operational Issues

The proposed line between Clonsilla and the M3 Interchange at Pace is 7.5km in length. Three stations are proposed at Hansfield, Dunboyne and a major park and ride station at the M3 Interchange. A 15 minute peak hour service is proposed, with a thirty minute off peak service.

From the outset it was noted that the ability to reopen a line from the M3 Interchange at Pace to Clonsilla, bringing passengers into the city centre, was entirely dependent on a city centre capacity resolution. The capacity of the city centre corridor (Connolly-Pearse) is at its limit and without a resolution no additional services, including this proposed service from M3 Interchange at Pace, would be feasible. The resolution of this issue is outside the scope of this project but will be a determining factor on if and when the project could proceed.

Capital Cost

The total cost of re-opening the line and acquiring trains is estimated at €156m comprising

Railway Infrastructure	**€68m**
Property Acquisition	**€40m**
Diesel Railcars	**€48m**
Total	**€156m**

It is estimated that the annual patronage will be 2.0m yielding revenues of €3.0m. The annual operating costs are projected at €3.3m. The service will, at best, cover its direct operating costs and would not generate profits to fund financing or depreciation costs. The project is therefore not financially viable and has a negative financial net present value of €194m.

When wider economic social benefits are taken into account (time savings, accident savings, environmental benefits, decongestion benefits etc. the project yields a positive rate of return (€105m) and yields an internal rate of return of 10%. The project is economically viable.

Funding

The project cannot finance itself from operating profits and would have to be funded externally. There is little scope for Public Private Partnership although there is significant potential for private sector contributions through development levies in both Fingal and Meath County Council. A Section 49 Development Contribution Scheme should be introduced to part-finance the railway project. Additional development should be encouraged adjacent to the railway line to maximise patronage and increase levy contributions along the route. Land required for railway purposes adjacent to planned developments should be ceded free to the project.

Further study is required to determine the maximum potential of development levies. The balance of costs can only be funded by the Exchequer and the bulk of the initial costs would have to be borne by the Exchequer with levies flowing over a longer period.

Phasing

The issue of city centre track capacity is critical and must be addressed as a priority by Iarnród Éireann. The Clonsilla to M3 Interchange project can proceed in tandem. A Railway Order will be required since the land is no longer in Iarnród Éireann/CIE ownership. Allowing for design, Railway Order and tender and construction, the project would take 4 to 5 years to complete from date of approval.

SECTION 1 - BACKGROUND AND STUDY REMIT

The Line

The former Clonsilla to Navan railway opened in 1862. The line served Dunboyne, Fairyhouse, Dunshaughlin and a number of other villages en route to Navan. Passenger services operated until 1947 when services were interrupted due to fuel shortages. Some freight services operated through the 1950's and the line was closed and formerly abandoned in 1963. Following closure the land and buildings were sold to adjoining landowners and to private individuals. The alignment to the M3 Interchange at Pace, which is the subject of this study is still largely intact although heavily overgrown.

Previous Studies and Recommendations

The former line through Dunboyne and Clonsilla has been the subject of a number of studies and reports over recent years. Meath County Council have included re-opening the line in recent county development plans. In March 2000 Iarnród Éireann engaged Ove Arup to undertake the Dublin Suburban Rail Strategic Review which examined the line and concluded that: "a direct rail line to Dublin should be

included in the recommended strategy. This cannot be implemented without additional capacity in the city central area. Rail provision will need to be matched to the scale of development along the route, as well as in Navan and a phased approach is appropriate."

The DTO Platform for Change report September 2000, included the Clonsilla to Navan in its recommended strategy and proposed a two phased opening – Clonsilla to Dunboyne initially and then Dunboyne to Navan.

The Strategic Rail Review (Booz, Allen, Hamilton 2003) examined the feasibility for re-opening the entire route from Clonsilla to Navan and concluded that there was no economic case for re-opening the entire line to Navan. They did not consider the section between Clonsilla and Dunboyne as a discrete project.

In October 2003 Meath County Council commissioned Farrell Grant Sparks to undertake a pre feasibility study of the Clonsilla to Navan line and they recommended that a detailed feasibility study should be undertaken for the section between Clonsilla and the M3 Interchange.

Study remit

Following consultation between Meath County Council, Fingal County Council, Dublin Transportation and Iarnród Éireann it was agreed that Iarnród Éireann would undertake a detailed feasibility study jointly funded by the participating bodies. The remit of the study was agreed as:

1. **An assessment of the technical, engineering and operational aspects of the project.**
2. **Preparation of an outline scheme design and capital cost estimate**
3. **Projections of passenger demand, project patronage, revenue yield and operating costs.**
4. **Preparation of financial and economic cost benefit analysis taking due account of social and other external benefits.**
5. **An examination of funding options to finance the project e.g. development levies, PPP options etc.**
6. **Phasing options for delivery of the project within the context of budgetary constraints and to meet future land use and population expansion**
7. **Preparation of a business case for the project based on the foregoing.**

Reopening the former line to Navan is an objective of Meath County Council's Development Plan. The line could be reopened in stages and the purpose of this study is to examine the feasibility of reopening the section from Clonsilla to M3 Interchange as an initial stand alone phase. Further study would be required to examine the feasibility of the remaining sections to Navan.

SECTION 2: DEMAND AND REVENUE ASSESSMENT

2.1 Demand modelling

The Dublin Transportation Office (DTO) were commissioned by Iarnród Éireann in 2004 to undertake a major demand modelling simulation of all proposed rail developments across the suburban rail network in the GDA over the next decade and beyond. A model run of the proposed Clonsilla-M3 Interchange rail spur option was undertaken as part of this larger rail network modelling exercise. The modelling exercise was underpinned by an extensive reference to all relevant land-use and infrastructure development schemes planned within the study area for the foreseeable future.

Three new stations are proposed at the following locations with a major park and ride planned at Pace, M3 Interchange

- **Hansfield (Fingal)**
- **Dunboyne (Meath)**
- **Park and Ride at Pace / M3 Interchange (Meath)**

The output from the simulation is an A.M. peak hour forecast for the year 2016. It is necessary then to factor this peak forecast to provide an indication of the likely annual revenue streams that might accrue from a future service to M3 Interchange at Pace. The factors used in the analysis are based on established empirical data derived from recent Iarnród Éireann census data. The timeframe for the assessment is taken as 2016. A classification of all the assumptions used in the study is described in the next section.

2.2 Assumptions

The key modelling and general factoring assumptions used in the analysis are set out in the following table 2.2

Table 2.2

Land-Use / Population Assumptions	Rail Network Assumptions	Road Network Assumptions	General Factoring Assumptions
Dunboyne forecast to grow to 10,000 (from 5,300 currently) by 2011[1] Hansfield total population to grow to 7,000[2] Population within 10km buffer zone around the potential catchment corridor of the Pace P&R could grow to 150,000 by 2011[3]	Three new stations at Pace (M3 Interchange), Dunboyne, Hansfield) Three peak services operate in A.M Peak ex Pace DASH project completed LUAS Lines A,B, & C completed Spencer Dock in place Additional Rolling Stock in place	Macken Street Bridge completed Port Access Tunnel completed M50 upgrade project completed M1,M3, M4 & M7 committed schemes No new Demand Management measures	Average yield per passenger €1.50[4] Peak hour to annual conversion factor is 900[5]

[1] Source: Dunboyne Integrated Action Area Plan
[2] Source: DTO
[3] Source: Meath Co. Co.
[4] Average fare taking into account concessions, student & scholar fares, discounts etc
[5] Standard factoring method. Factor established from empirical analysis of Census Data

2.3 Key Findings

Demand

The output from the DTO demand modelling simulation for the three proposed stations is set out in the following table.

Proposed Stations	DTO Forecast A.M. Peak Hour Boardings 2016
M3 Park and Ride	1000
Dunboyne	500
Hansfield	800
Total	2300

Revenue

Using the DTO demand projections as the base input to the revenue analysis the following table indicates the potential revenue that could be generated from the proposed rail line in 2016

Factoring Assumptions	Calculation	2016 Annual Revenue Estimate (Current Prices)
Average Peak hour to Annual factor: 900 Average Yield: €1.50 DTO Forecast of Total Peak Hour Revenue Generating Trips: 2300	900 * 2300* €1.50	€3.1m

It is estimated that the Clonsilla-M3 Interchange Rail spur could generate an annual revenue in the region of €3.1m by 2016 at current prices. Total annual demand for the proposed Clonsilla- M3 Interchange spur is estimated at around 2 million passengers per annum by 2016

2.4 Sensitivity Analysis

To gauge the sensitivity of revenue on the proposed Clonsilla- M3 Interchange Rail spur, it is estimated that a 5 cent increase in fares is likely to increase annual revenue by around €0.1m at current prices. This estimate does not take into account price elasticity factors and assumes that demand will remain unchanged when a small fare increase is imposed. The demand for rail is relatively inelastic at low levels of marginal rail fare increments.

2.5 Wider Issues

There are a number of wider issues which may need further consideration when assessing the business case for the Clonsilla – M3 Interchange Rail spur. These include;

- **Toll plaza to be located on M3 just north of proposed Park and Ride site**
- **Much improved Road linkages via M3 and M50 upgrade**
- **Charging for car parking has not been taken into account in the demand analysis**

The DTO model does not yet have the sensitivity to model Park and Ride and associated car parking charges.

2.6 Conclusions of Demand Assessment

- **DTO model predicts 2300 A.M. peak hour boardings by 2016**
- **Potential 2 million passenger journeys and €3.1m per annum in revenue by 2016**
- **The detailed demand modelling exercise would suggest a future service pattern along the proposed Clonsilla – M3 Interchange line of the following order;**

  Peak: 3 to 4 trains per hour
  Off Peak 2 trains per hour

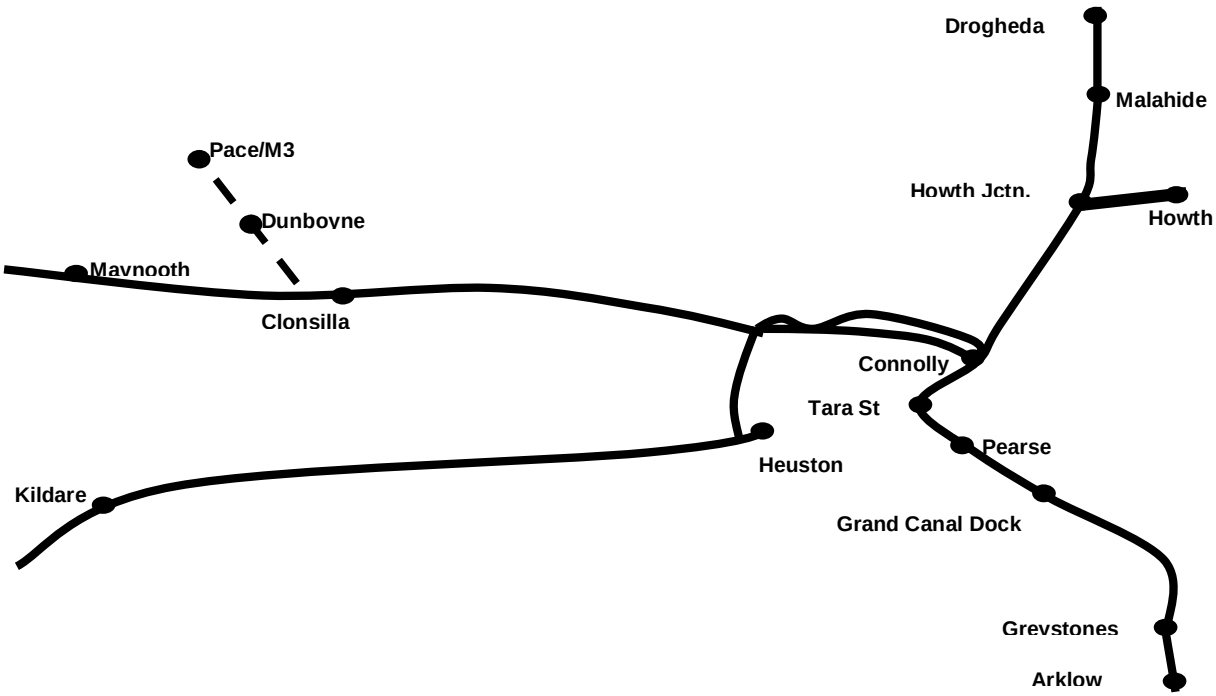
- **It is clear from the DTO projections that the overall performance of the proposed rail spur is largely influenced by the success of the proposed park and ride scheme at M3 Interchange.**

SECTION 3 - OPERATIONAL FEASABILITY AND SERVICE OPTIONS

3.1 Existing Rail Network

The existing rail network in the Greater Dublin Area is illustrated in Fig. 3.1 below. Commuter services are provided on 4 corridors radiating from the city centre – to Drogheda, Maynooth, Kildare and Arklow. The DART operates between Malahide/Howth to Greystones.

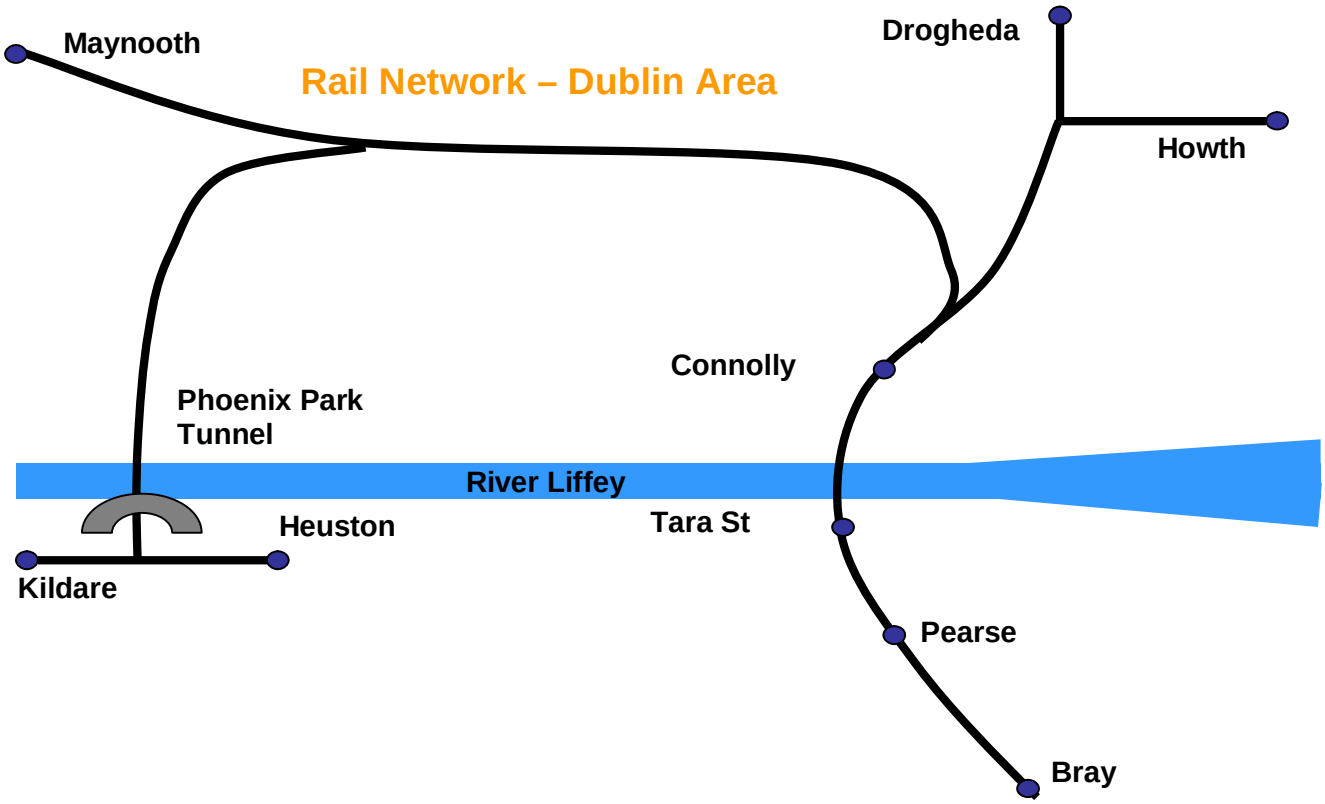
Fig. 3.1 Existing Rail Network Dublin Area



3.2 City Centre Capacity Constraints

The central area network is shown in Fig. 3.2. All services from the northern line, Maynooth lines, and DART lines converge on Connolly station and the critical section of track between Connolly and Pearse stations is currently at full capacity. The DART Upgrade Project, which is currently underway, will provide additional capacity (from 6 carriage trains to 8 carriage trains) and works at Connolly station's platform 7 will permit 2 additional services from the Maynooth corridor terminating at Connolly.

Fig. 3. 2



3.3 Maynooth Line Services

The existing peak period inbound service on the Maynooth line is shown in Table 3.1 below:

Table 3.1: Maynooth Line Peak Inbound

Maynooth	Clonsilla	Connolly
07.00	07.15	07.40
07.33	07.50	08.20
07.57	08.14	08.43
08.15	08.32	09.04
09.02	09.17	09.42

There are in effect 3 peak services within any peak hour. Each of the above services is full to capacity and there is evidence of substantial latent demand on the corridor that chooses not to travel because of lack of capacity or infrequent service.

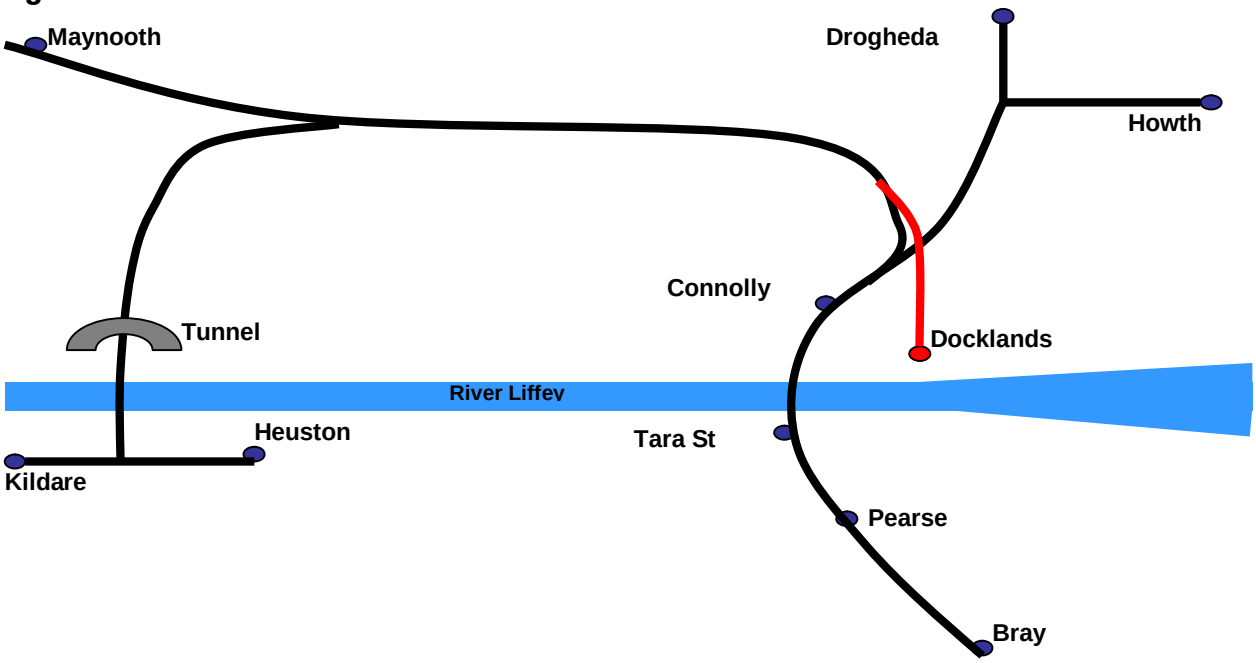
Any short term additional capacity provided on the corridor will be absorbed immediately by latent demand and the new demand generated by major housing developments at Pelletstown, Phoenix Park Racecourse, Porterstown etc.

It is clear therefore that no additional services can be accommodated from the M3 Interchange at Pace without a significant increase in capacity in the central area.

3.4 Central Area Capacity Enhancement

Iarnród Éireann have examined a number of options for increasing track capacity in the centre of Dublin over recent years. The options examined include (1) resignalling to permit higher frequency (2) expansion of Connolly Station platform capacity (3) a new Docklands station and (4) re-opening the former Broadstone terminal.

Fig. 3.3



The proposed Docklands station is illustrated in Fig.3.3 above. The new station would facilitate a major increase in services on the Maynooth line and would also facilitate new services from the M3 Interchange at Pace.

Iarnród Éireann's demand modelling work on the Maynooth corridor has indicated a peak hour flow equivalent to 8 trains per hour. The Clonsilla-M3 Interchange spur would increase the demand by approximately 2 equivalent train loads. This service pattern could be accommodated with trains terminating at Connolly Platform 7, Grand Canal Dock or Docklands. The service pattern at the Maynooth and M3 Interchange ends might commence as 5 from Maynooth and 3 from M3 Interchange and expand to 6 from Maynooth & 4 from M3 Interchange. This would give 15 minute peak service from the M3 Interchange which would be critical to attracting Park and Ride customers.

Summary of Operational Feasibility and Service Options

- **The present Maynooth line has been upgraded in recent years but the service is still constrained because of track capacity in the central area and availability of rolling stock.**

- **IE have projects underway to provide some limited additional capacity and new railcars are on order. However, this will be absorbed totally by existing latent demand and new population infill.**

- **Additional terminal capacity is required to cater for future Maynooth line growth and to facilitate the Clonsilla-M3 Interchange spur. The preferred location is in the Docklands. The Clonsilla-M3 Interchange Spur cannot be opened prior to new city terminal capacity being in place.**

- **The level of service needed for both the Clonsilla-M3 Interchange and Maynooth line expansion can be catered for at Docklands and Connolly.**

SECTION 4 – INFRASTRUCTURE & CAPITAL COSTS

4.1 Existing Route Description

In 1963 the former Clonsilla to Navan railway line was closed and officially abandoned. The property was sold by CIE to local landowners and the overbridges were transferred into the ownership of the relevant county councils. The old route remains to this day, largely intact though heavily overgrown. The following are some of the alterations that have been made since line closure which will require addressing should the proposal to reinstate the line get approval and funding.

The former rail line crossed the Royal Canal by an overbridge which has since been removed. A new bridge would have to be built to enable the proposed line to cross the canal on leaving Clonsilla Station.

Existing bridge abutments at Royal Canal

An accommodation bridge crossed the railway in the Clonee area; this is now in a state of disrepair and no longer in use. It is proposed to remove it.
An ESB pylon is located on the old railway route and this would have to be relocated outside the proposed track alignment.

ESB pylon to be relocated

At Dunboyne former station, the station building has become a private residence and the area between the old platforms, along the proposed rail route, has been filled in and developed into a garden.
A surface water and sewer pipe has been laid along the rail route at Dunboyne, beside Millfarm housing estate. These will require relocation outside the proposed track alignment.
The Millfarm housing estate encroaches on the old track alignment which will force the alignment to slew eastwards, causing additional earthworks.
A number of properties at Bracetown have extended their gardens across the proposed alignment.

Millfarm housing estate

Two bridges, under disrepair, will require reinstating at Bennetstown.

Bridge over river at Bennetstown

At Pace, the proposed end-point of the line, the railway crosses under the proposed M3-Pace interchange. Provision has been made by the NRA to accommodate this interface.
The area between Dunboyne and Pace is known to be in a flood zone and this will affect the design criteria of the proposed route.

4.2 Preliminary EIA

A preliminary Environmental Impact Assessment report was commissioned by Iarnród Éireann as part of the feasibility study. The report deals primarily with environmental matters but also looked at broader planning issues affecting the proposal. Should the proposal be taken beyond the feasibility study stage, a detailed Environmental Impact Statement (EIS) will be required and a function of the preliminary report was to identify the scope of that detailed statement.

The Royal Canal – a Natural Heritage Area (NHA)

Listed Structures:

Barnhill Bridge

Bennetstown Road Bridge

Conclusions of Preliminary EIA

Issues that require to be addressed at an early stage and which could be of major significance to the overall scheme include:

- **The extent of the presence of bats and the options for dealing with the issue.**
- **The detailed arrangements for access to the park and ride facility at Pace, especially in relation to proposed tollbooths on the M3.**
- **The most appropriate strategy for the provision of parking at the stations, in the context of competing demands from local commuters and those accessing the station from a distance, local road network conditions and the potential provision of public transport links to the stations.**
- **The detailed layout at Dunboyne Station with regard to access and the extent to which the properties can be protected to mitigate against noise and vibration.**
- **The impact of noise and vibration on houses in close proximity to the proposed railway line will need to be assessed and addressed at the design stage.**
- **The potential requirement to remove, alter or re-build the two listed bridges.**
- **The design of the bridge over the Royal Canal with regard to potential impacts on the NHA and the provision of access along the canal.**
- **The need to maintain connectivity in properties severed by the proposal.**
- **Monitoring of the proposed SDZ at Hansfield and review of the project in the light of the decision on the SDZ.**

4.3 Hydrology

A surface water/hydrology study was commissioned by Iarnród Éireann as part of the feasibility study. This was deemed necessary at this feasibility stage because of the risk of flood in the area due to its close proximity to the Tolka River. The study included the following:

- **A review of the proposed underpasses and park and ride facilities at the Pace interchange. The review is to take account of predicted River Tolka flood levels and the bridge and railway alignments necessary to integrate with the proposed M3 motorway.**
- **Identification of drainage and flood impact mitigation measures that may need to be provided/instigated prior to and during the implementation of the proposed development.**
- **An assessment of drainage requirements in accordance with current best practice, the Local Authority's relevant 'Development Plan', other relevant documents and statutory requirements to develop a stormwater management strategy.**
- **A detailed assessment of the culverting/bridging requirements over the River Tolka, including mitigation measures to offset any increase in flood risk to the proposed railway and downstream users. Constraints associated with the railway vertical alignment, flood risks and underpass clearances were to be identified and minimum track levels defined. The minimum track levels will enable further assessments of the railway alignment, associated cut/fill options and screening requirements.**

Conclusions of Hydrological Study

This report found that the flood hazards that the River Tolka and Castle Stream present the Clonsilla to M3 Interchange railway can be satisfactorily managed by the incorporation of appropriately sized bridge crossings and maintaining the vertical alignment of the track above the predicted 100 year flood level.
The impacts on water quality and increased flood risk, that the railway may present to the existing water courses, can be offset by the inclusion of appropriate water quality measures, suitable sizing of bridge crossings and provision of floodplain and storm runoff storage.

4.4 Structural Survey

An assessment of structures along the route was commissioned by Iarnród Éireann as part of the feasibility study. This report presents a preliminary assessment of the bridge and culvert structures required to facilitate the reopening of the line. Some of the original structures on the line remain, in varying states of repair. Where rehabilitation of the existing structures, or parts thereof, is feasible, the extent of the remedial measures required is identified, based on the measures necessary to ensure conformity with current standards for loading and the level of containment provided by the parapets and safety-fences on the approach-roads.

The structures and proposed works are summarised as follows:

- **A new steel girder superstructure placed over the Royal Canal bearing on new piled foundations with the existing abutments retained.**
- **3 existing over bridges carrying Regional and County roads over the proposed railway. Each is a single-course stone arch structure generally of good condition. The parapet walls require strengthening and increasing in height to current standards. The approach embankments require upgrading.**
- **3 structures are required across rivers. These could be either a single span bridge or a series of adjacent box culverts, with the waterway area dictated by the hydrological study.**
- **Approximately 6 culverts have been identified as required by the hydrological study. Some culverts exist and require assessment as to their suitability to accommodate the new railway whilst others are new.**
- **Bridges or culverts are required for third party accommodation works including an underpass for the canal tow path along with a new culvert or bridge to carry the access road to the park and ride car park.**
- **2 bridges currently spanning over the proposed rail alignment require demolition, both are single-course stone arch structures. One bridge is a redundant farm accommodation crossing in poor state of repair whilst the other is a listed structure carrying the existing R149 over the railway. This demolition is necessary to accommodate raised track levels required to ensure the track is above predicted flood levels.**

4.5 Route Options examined

It is proposed to keep to the old railway alignment as far as physically possible, as although overgrown, it is largely intact. Refer to Appendix 1: Location Map. In locations, beyond Dunboyne, the proposed scheme is forced due to encroachment on the old alignment to realign the track eastwards. This will result in additional earthworks.

The location of the stations was examined and it was deemed that Hansfield, Dunboyne and Pace Interchange were the more viable options.
At only 1.2km from Clonsilla Station the location of Hansfield Station is not considered ideal with the distance from there to Dunboyne Station at almost 4km. However it was decided that assuming the Hansfield SDZ proposal proceeds it would be a more logical location at this time than midway between Clonsilla and Dunboyne where no development is currently proposed.

The location of the final station at Pace has been chosen to allow interchange with the proposed M3 motorway. The location of the proposed station is north of the M3 interchange at Pace. Options were examined to locate the station a) south of the interchange to avoid locating platforms beneath the motorway interchange and b) further northwards before the proposed M3 toll plaza. Option a) was discounted as a further interface with the station and the river Tolka would be created. Option b) also had to be discounted. The location of the toll plaza 2km before the Pace interchange exit is unfortunate as it may discourage prospective rail passengers who will not exit the motorway and use the Park and Ride facility after paying the motorway toll. As the location of the toll plaza is now fixed, to locate the Park and Ride Station north of this to avoid the toll would require relocation to a position 10km further northwards at Dunshaughlin. This was not considered feasible or cost effective at this stage. A solution to the issue may be a joint venture or arrangement with the toll operator to encourage M3 road-users to then use the Park and Ride facility.

The next step was to choose the ideal track configuration. Two value management workshops were held with high level departmental representatives within Iarnród Éireann. At the first workshop track configuration options were proposed and discussed with three options chosen for more detailed examination and high level costing. The three options chosen were:

Option 1: Double track from Clonsilla to Pace
Option 2: Double track from Clonsilla to Hansfield and single track to Pace with a passing loop at Dunboyne
Option 3: Double track from Clonsilla to Hansfield and single track to Pace

The second workshop addressed the three options proposed and considered the following criteria - safety, track capacity, reliability, maintenance, future proofing , costs and journey time. Option one was chosen as the preferred option to carry forward as the proposed route configuration.

4.6 Chosen Option

The chosen option from the second value management workshop was the double track option from Clonsilla to the end of the proposed line at Pace/M3 interchange. This allows for a robust and reliable service, which does not eliminate the ability of a further extension in the future. Safety and future maintenance were also considerations that lead to this decision.

The scheme allows for ease of connection to the Maynooth line at Clonsilla Station and sufficient allowance for the turning and holding of trains at Pace.
Without a detailed design it is proposed that the horizontal alignment follows in the main, as previously discussed, the old Navan route with some minor deviation due to encroachment on the line beyond the old Dunboyne Station. The vertical alignment will also remain at approximately the same height as existing ground level until it reaches Dunboyne. Over the distance from north of Millfarm (Dunboyne) to M3 Interchange Park & Ride station the track will rise to a level in the order of 1.6m above existing ground level to avoid the major flood zone of the Tolka River, as indicated in the hydrological report. Thus major earthworks will be required along this final section to facilitate the required vertical alignment.

As the proposed Clonsilla-M3 Interchange Spur links into the existing Maynooth line at Clonsilla, at this feasibility stage, it is currently proposed to provide three stations at Hansfield, Dunboyne and Pace Park & Ride that are similar in design to those on the Maynooth line for architectural continuity. The stations will be fully accessible and there will be compliance with the Department of Transport action plan produced to support the Disability Equality Bill 2004. As is standard in all new stations, CCTV security, local PA, ticket validation machines, ticket vending machines and help points will be provided.

M3 Implications
An assumption has been made that the proposed M3 motorway will be in position before the completion of the proposed rail spur. Should this not be the case there will be an impact on the access to Pace Park & Ride and the R149 and on the programming of the project and the associated cost implications. The final (Park & Ride) station on the proposed route is located at the M3/N3 interchange with access to the station from a new road off this interchange proposed by the M3 scheme.

4.7 Property requirements

As previously noted under other sections of this feasibility study, Iarnród Éireann sold off its property interests along the proposed route when the old Navan Line was abandoned in 1963. At this point in time it is estimated that there are approximately 49 properties that will be affected should the proposal proceed.

An assessment of the cost of acquiring the land, both permanent and temporary has been undertaken. On the assumption that any acquisition would be by means of compulsory purchase and for the purposes of this exercise provision has been made for the value of land, plus disturbance, severance/injurious affection and associated costs. The estimate is based on land values etc as of December 2004, and is valid for approximately 3 months only due to the nature of the property market in which values change continually.

The estimate of €35m (inclusive of stamp duty, VAT and legal fees) is based on preliminary site visits, planning and land ownership searches.

At this stage, without detailed design, it is assumed it is not necessary to replace/reconstruct the majority of the bridges over the railway; the need to replace/reconstruct would substantially increase land requirements and therefore estimated land costs.

4.8 Capital Cost estimate

The preliminary environmental impact assessment, hydrological report and structural reports have been used to assist in the estimating of the cost of this project. Previous projects experience in particular for the trackwork, signalling, telecom and electrical elements and current construction costs were also used.

It should be noted that this is a feasibility report and the estimating of costs reflect this level of detail with an outline scheme design undertaken at this stage of the project. Taking this into consideration a contingency of 15% is applied to the project cost. No inflation rate has been applied at this time.

The infrastructural cost of the project is outlined in Table 4.7 below.

Table 4.7: Infrastructural Cost Estimate

Description	Estimated Infrastructure Costs €m
Civils Works	33
Permanent Way, Signalling, Electrical, Telecoms	15
Land & Property	35
Sub Total	83
Project Management	12
Risk & Contingency – 15%	13
Project Total (including VAT)	108

SECTION 5 – OPERATING COSTS

5.1 Assumptions

As outlined in earlier sections the Clonsilla-M3 Interchange spur can only operate if additional terminal capacity can be provided in the city centre area. In determining the operating costs of the link, it is assumed that the Maynooth line service will be enhanced to meet demand on the Maynooth corridor and that the Clonsilla-M3 Interchange line carries the incremental costs of operating the additional services on the Clonsilla-M3 Interchange branch. If the Clonsilla-M3 Interchange line is opened there would be a sharing of resources with the Maynooth corridor and services would interwork on the corridor to Dublin. In the analysis of operating costs, the Clonsilla-M3 Interchange branch is charged with the full fixed costs associated with the Spur line (stations signalling and track maintenance) and the incremental costs of running the Clonsilla-M3 Interchange trains, additional to the enhanced Maynooth line service.

5.2 Cost Items

The main costs associated with the service are: - station operations, train crews, train maintenance, track maintenance and central administration. It is assumed at this point that the stations would be manned during opening hours – 1 person supported by ticketing vending machines. It is assumed that the park and ride facility will be manned by an outside party funded by receipts. The estimated annual operating costs are outlined in the table below. Note that the operating costs exclude any provision for financing or depreciation costs.

Table 5.1: Annual operating Costs

Stations Operating Costs	€0.71m
Train Operating Costs	€1.93m
Track Maintenance Costs	€0.36m
Central Admin (10%)	€0.30m
Total Operating Costs	€3.30m

The annual operating costs will amount to €3.3m per annum from the beginning of the new service.

SECTION 6 - FINANCIAL COST BENEFIT ANALYSIS

6.1 Capital and Operating Costs.

The incremental capital costs of opening the Clonsilla-M3 Interchange service consist of building the spur, the opening of the three new stations and land acquisition. The total cost of the spur is estimated at €108m including VAT. New rolling stock will be required for the Spur. This has been estimated at 24 carriages costing €2.0m per carriage (including VAT) equating to €48m. The total capital cost is therefore €156m.

The increase in annual operating costs (peak and off peak) was calculated to be €3.3m (in 2004 prices) as outlined in section 5. The annual revenue generated by the service was estimated at €3.1m per annum as outlined in section 2.

The revenue earned would be insufficient to cover direct operating costs and a small operating deficit would be generated. This would be the norm for commuter rail projects of this nature. At best, within the sensitivities of the revenue and cost assumptions, the service would break even. However, no profits would be generated to fund the substantial financing and depreciation costs.

6.2 Financial Evaluation.

The costs and revenue of the Clonsilla-M3 Interchange project were analysed over a 30-year period. Both costs and revenues are discounted to present values using the discount rate of 5% recommended by the Department of Finance.

The results of the financial analysis are summarised in the following table:

	€
Total Cost (discounted)	238m
Total Revenue (discounted)	44m
Net Present Value	-194m

The Project has a very high negative rate of return and is not financially viable.

SECTION 7 – ECONOMIC COST BENEFIT ANALYSIS

7.1 Do Minimum and Do Something Definitions.

In a cost benefit analysis (CBA) it is good practice to compare a project with a 'Do Minimum' scenario. The 'Do Minimum' option generally assumes that certain expenditures will be incurred regardless of the implementation of the 'Do Something' project. As such certain costs (and benefits) are common to both options and therefore cancel in any cost benefit comparison.

Iarnród Éireann has recently undertaken an analysis of future investments in the Dublin Suburban network, whereby certain project phases were compared to 'Do Nothing/Do Minimum' scenarios. For the Maynooth Line the 'Do Minimum' was defined as the existing timetable taking account of recent diesel railcar additions. A phased expansion of services on the Maynooth line was assumed:

Phase 1: Additional peak services to Connolly

Phase 2: Additional services to a new Dockland station.

Phase 3: A Spur to Pace/M3.

The economic benefits of Phase 3 over and above the Do Minimum, Phase 1 and Phase 2 was therefore the subject of this analysis.

7.2 Capital and Operating Costs.

The incremental capital costs of opening the Clonsilla-M3 Interchange service consist of building the spur, the opening of the three new stations and land acquisition. The total cost of the spur is estimated at €108m including VAT. In a CBA these taxes represent transfer payments and when netted out, the total costs reduce to €99m. The total cost of rolling stock excluding VAT is €38m.

The increase in operating costs was estimated at €3.3m.

7.3 Benefits.

The benefits of the investment relate primarily to the impact of the additional services and capacity increases on the affected routes.

Time savings

The additional services will give rise to an increase in the number of new/generated rail passengers.
In terms of time savings these new passengers would have travelled by road in the absence of the investment. By comparing the journey times by car and bus with the rail option gives a measure of the time benefits which will accrue to new rail passengers. These average time savings are then translated to monetary terms by multiplying by recommended values of time. Because the rail passengers are new/generated the rule of one half is applied.

Vehicle Operating Costs.
The switch of travellers from road to rail will lead to a reduction in the resource costs of road travel (fuel, oil etc). Determining the reduction in vehicle kilometres and multiplying by a unit cost gives a monetary value for vehicle operating costs.

Accident Savings.
The reduction in road vehicle kilometres will lead to a reduction in road accidents, and by applying recommended accident valuations, the monetary benefits of road accident reductions can be determined.

Environmental Benefits
Road vehicles create air pollution emissions and noise impacts which can be measured by pollution values per million vehicle kilometres times the reduction in vehicle usage.

Decongestion Benefits.
The reduction in road vehicle kilometres should lead to a reduction in road congestion. By dividing the vehicle kilometres by an average car occupancy of 1.42 we can estimate the number of vehicle kilometres removed from the road network. A reduction of 15% induced traffic has to be applied to vehicle kilometres removed to allow for additional highway journeys made as road space is freed up. Following the Dublin Suburban Rail Strategic Review by Ove Arup a decongestion benefit in terms of minutes saved per passenger car unit kilometre can be applied. Ove Arup used 4 minutes per car kilometre reduction and this was converted into monetary values by applying the value of time estimates used in the time savings benefit calculations above.

7.4 Economic Evaluation.

The costs and benefits of the Clonsilla-M3 Interchange project can be compared over a 30-year period, which is the norm in CBA. Both costs and benefits are discounted to present values using the discount rate of 5% recommended by the Department of Finance. The results of the economic evaluation are summarised in the following table:

Total Discounted Costs	€218m
Total Discounted Benefits	€323m
Net Present Value	€+105m
Internal Rate of Return	10%

The project yields a positive net present value of €105m and an internal rate of return of 10%.

SECTION 8 - FUNDING

8.1 Funding Options

As outlined in Section 6, the project will at best cover its direct operating costs and will not generate profits to meet financing and depreciation costs. Funding options can be characterised as follows:

A. EU / Central Government
B. Iarnród Éireann Investment
C. Local Authority Sourcing/Levy Schemes
D. Private Sector Funding

A. EU / Central Government

Investment in transport and in particular rail transport has increased substantially in recent years and indications from the Minister for Transport are that this will continue into the future. However, there are a large number of projects competing for available investment both nationally and in the Greater Dublin Area. The Clonsilla to M3 Interchange project must be evaluated in the context of competing priorities.

EU funding has been available to co-finance railway projects over the past decade but these funds have now ceased and there is no prospect of EU funding for the project.

B. Iarnród Éireann Investment

Over recent years, Iarnród Éireann's funding for capital projects comes entirely from Exchequer sources and the Clonsilla to M3 Interchange project could only be funded in the same way. No commercial case could be made for borrowing to invest in the project.

C. Local Authority Sourcing

Local Authorities have mechanisms to request contributions from development to fund the provision of infrastructure, open space and after community and recreational facilities. In terms of land use strategies, the line is situated within the administrative areas of Fingal and Meath County Councils.
The draft Fingal Development Plan actively looks to seek the development of a high quality public transport system within and throughout the County. Policy TP13 of the Draft Development Plan refers to investigating the practicability of Section 49 – Development Contributions Schemes.
The Meath County Development Plan, 2001 makes reference to sustainable development principles (#Section 2.6.1) which includes concentrating development into those centres that can be economically provided with high quality transport and other services, and the promotion of relatively compact urban forms with higher residential densities on public transport corridors.

In both counties there is potential for funds to be raised, with the County Councils agreement, on new development in the area along the proposed

railway line between Clonsilla and Pace, given that there are large tranches, of development land adjoining the line at Hansfield and Dunboyne in particular: based on the benefits given from the provision of railway stations both the present and future development lands are candidates for development contributions.

Section 49 Development Contribution Schemes have been applied to date by Cork County Council for the Middleton Line and by Dun Laoghaire Rathdown County Council for the Luas extension to Cherrywood. Applying Dun Laoghaire Rathdown rates to the already planned developments could, for example, yield contributions of up to €30m.

These are indicative and further study is required. These are based on planned developments and clearly there are further development opportunities adjacent to the line which both local authorities should consider. It is important that this is progressed further with both Meath and Fingal County Councils at an early stage of the project.

The Local Authorities should consider appropriate phasing arrangements for the development of lands along the railway corridor which should be linked to the provision of the new rail service.

D. Private - Sector Funding

Private – Sector funding has been employed, in the form of direct payment and in the form of a Public – Private partnership for a number of major national infrastructure schemes in the past few years. There are a number of vehicles by which private – sector funding may be achieved.

One such is the funding of railway infrastructure on the basis of informal discussion or an informal agreement between IE and the relevant landowner / developer. Any landowner who will benefit from the project may be persuaded to provide land, a station or other structure to the project. The ability to persuade landowners to contribute depends on the leverage available. The Special Development Contribution Schemes [S. 49 Schemes] are a critical element of Iarnród Éireann's leverage. Such agreements can result in a poor return for Iarnród Éireann who may be in a weak position during negotiations. Furthermore if there is an application of Section 48 by the local authority this will impact negatively on the potential to gain funding within negotiations as there is an incorrect perception on the part of the developers that they are "double paying" for infrastructure.

There is no provision at present for IE to enter into joint venture agreement with developers. The payments to the private sector under a PPP are subject a stringent performance regime. It is however felt that this option would not be suitable for the Clonsilla – M3 Interchange line.

<u>Car Parks</u>

Park and ride will be critical to the success of the railway and substantial provision has been made for investment in car parking. It is recommended that

consideration be given to alternative ways of providing and running car parks. There is a potential role for private sector involvement in this area.

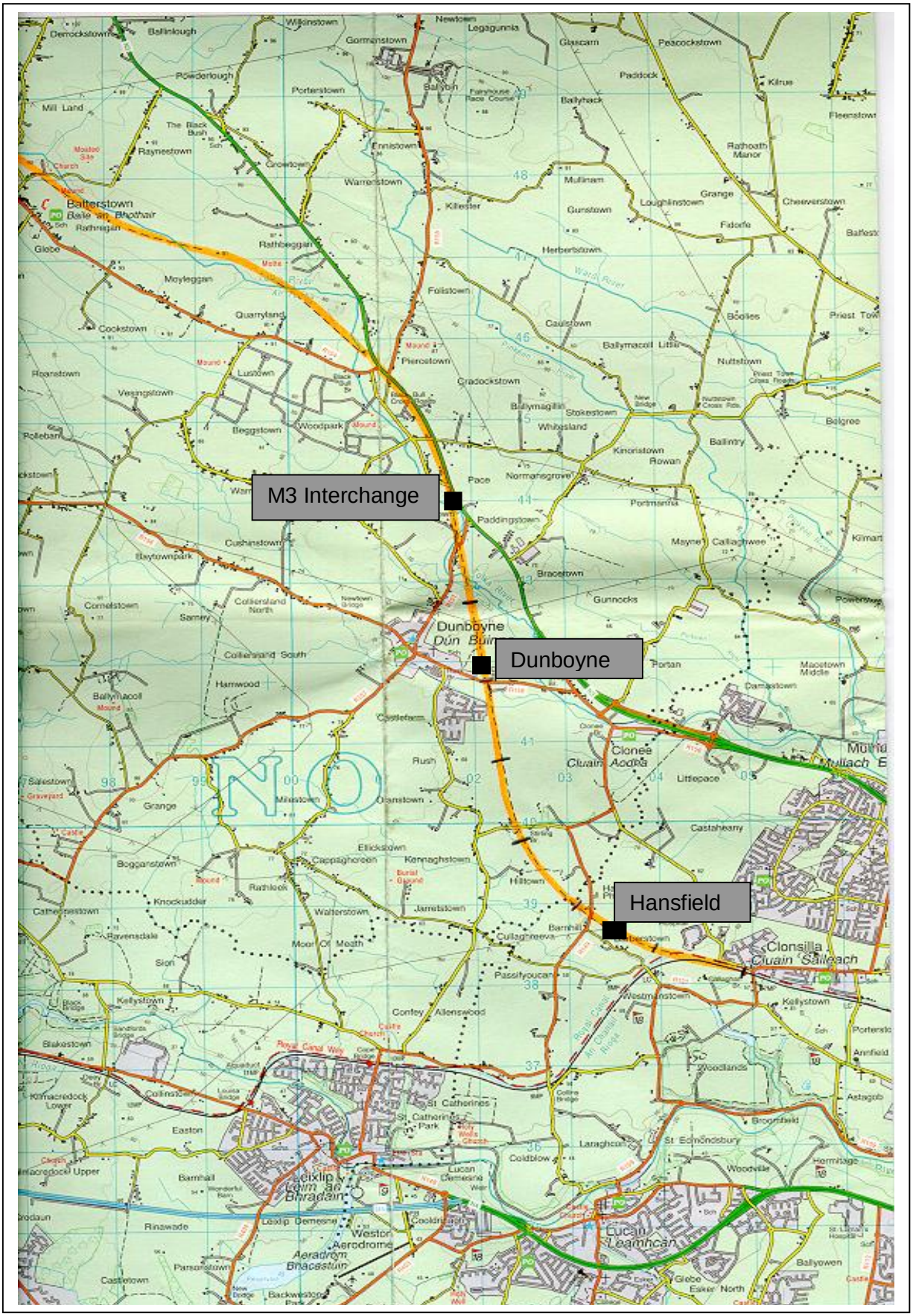
SECTION 9 – PHASING THE PROJECT

As previously noted in this report the Clonsilla – M3 Interchange spur cannot be implemented without additional capacity in the Dublin central area.

In addition to the detailed design of the project a Railway Order Process would also have to be followed prior to any construction. Iarnród Éireann no longer owns the property over which the proposed route would run and it would thus have to evoke compulsory purchasing powers through a Railway Order.
It is estimated that, should funding of the project be available, the project approval process would take six months in duration followed by a two year period for Detailed Design and Tender Stage and to proceed with a Railway Order application. A two year construction period for the project is also estimated. Thus the project could take 4 to 5 years to progress to completion.

Appendix 1

Location Map


M3 Interchange
Dunboyne
Hansfield