

Social needs for transport and gaps in transit service: Enniscorthy and other parts of County Wexford

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Introduction

The CONUNDRUM project relates to sustainable transport, community mobility and co-creation, and is using Enniscorthy in County Wexford, Ireland, as a test bed. However, assessments and mapping of social needs for transport, and public transport supply provided in Enniscorthy, and how these compare to other places in Ireland, do not appear to be publically available.

Currie et al¹ developed a methodology for assessing spatial gaps between social needs and transit supply An R package² has recently been developed that facilitates the calculation of the transit supply levels from General Transit Feed Specification (GTFS) datasets.

This note presents results obtained by applying the gtfsupply index R package to Ireland's GTFS dataset, with an emphasis on Enniscorthy in county Wexford.

Background

Transit supply

The social needs-gap analysis methodology involves calculating a Supply Index (SI) based on the number of transit service arrivals at stops in and around each area of interest. Adjustments are made for the amount of each area that is within a typical walking distance of each stop, according to the following formula:

$$SI_{area,time} = \sum \frac{Area_{Bn}}{Area_{area}} SL_{n,time}$$

where:

- $SI_{area,time}$ is the Supply Index for the area of interest and a given period of time;
- $Area_{Bn}$ is the buffer area for each stop (n) within the area of interest³;
- $Area_{area}$ is the area of the area of interest; and
- $SL_{n,time}$ is the number of transit arrivals for each stop within the given time period.

¹ "Quantitative Approaches to Needs Based Assessment of Public Transport Services: The Hobart Transport Needs Gap Study," Journal Article, 2003, [https://www.semanticscholar.org/paper/2c049091caf56c66efc532ad2bdd774d8efc0eb/](https://www.semanticscholar.org/paper/2c049091caf56c66efc532ad2bdd774d8efc0eb;); "Gap Analysis of Public Transport Needs:measuring Spatial Distribution of Public Transport Needs and Identifying Gaps in the Quality of Public Transport Provision," *Transportation Research Record* 1895 (2004): 137–46, doi:10.3141/1895-18; "Identifying Spatial Gaps in Public Transport Provision for Socially Disadvantaged Australians: The Melbourne 'Needs Gap' Study," 2007; Graham Currie, "Quantifying Spatial Gaps in Public Transport Supply Based on Social Needs," *Journal of Transport Geography* 18, no. 1 (2010): 31–41.

² See <https://github.com/James-Reynolds/gtfsupplyindex>

³ In Currie, "Quantifying Spatial Gaps in Public Transport Supply Based on Social Needs" this was based on a radius of 400 metres for bus and tram stops, and 800 metres for railway stations. The same definition is used here.

As such, the SI combines coverage (accessibility to transit) and service frequency (accessibility by transit). The SI is a relative index, allowing comparison between different areas of interest, based on transit supplied over a specific time period. In the results reported in Currie⁴ transit supply was assessed based on an entire week, and compared across Census Collection Districts (CCDs) within Greater Melbourne. CCDs were classify into seven groups based on SI scores⁵.

Transport needs

Transport needs were similarly assessed using a index score, based on various metrics available from the Australian Bureau of Statistics (ABS). These included the Index of Relative Socio-Economic Advantage/Disadvantage (IRSAD), which is reported directly by the ABS based on 31 weighted indicators and data collected during the census. A transport-specific need index, based on eight weighted indicators⁶ was also included, with scores categorised based on three groups below and three groups above the average score across all of Melbourne.

Clearly, the approach used to assess social needs for transport might need to be adjusted to reflect different data availability in different locations or from different editions of a census.

Needs-gaps

The final step was to compare social needs for transport with the amount of transit supplied in each area of interest. A key finding was that “8.2% of Melbourne residents ha(d) ‘very high’ needs but ‘zero’, ‘low’ or ‘very low’ public transport supply”, reflective of areas of greater need often being in places on urban fringes or otherwise often remote from transit infrastructure and services.

More broadly, it was suggested that the developed methodology might be “substantially more useful than the presentation of anecdotal evidence which is the most common means of identifying transport needs in local transport studies throughout the world”⁷.

Methodology

Supply Index

This analysis used the all-Ireland GTFS dataset, downloaded on April 23, 2025 and reporting scores for transit services provided on that same date (the first Wednesday after Easter). The “Small Area” National Statistical Boundaries from 2022 were adopted as the areas

⁴ Ibid.

⁵ being those with: zero supply; very low, low, or below average supply; and above average, high or very high supply.

CCDs with above and below average SIs were evenly split into each of the three sub-groups, respectively.

⁶ Adults without cars (0.19), distance to the Melbourne Central Business District (0.15), persons aged over 60 years (0.14), persons on a disability pension (0.12), low income households (0.10), adults not in the labour force (0.09), students (0.09) and persons 5-9 years (0.12).

⁷ Currie, “Quantifying Spatial Gaps in Public Transport Supply Based on Social Needs.”

of interest, with the indexing of supply based on the average score across the County of Wexford.

Needs

The Irish Census (2022) reports various indicators for “Small Area”, but these do not match those used in the Currie (2007) or other previous needs-gap analyses. However, there are some that are similar⁸, but there does not appear to be a IRSAD or similar socio-economic indicator available.

As such, this analysis adapts the Currie (2007) approach and uses the same weighting for the following indicators: households without cars (0.19); distance to Wexford (0.15); persons aged 60 years and over (0.14), persons unable to work due to permanent sickness or disability (0.12), those aged 15 years or older who are not at work; students (0.09) and people aged 5-9 years (0.12). Each of these indicators were normalised across all of the Small Areas in County Wexford, weighted as indicated to develop a combined value that was then weighted by the total population in each Small Area to produce the combined indicator of social need for transport used in this analysis.

Results

County Wexford

TRANSIT SUPPLY: Figure 1 shows the share of the County Wexford population by the transit supply category of their Small Area of residence, while Figure 2 maps Small Areas in County Wexford by transit supply category. Table 1 shows summary statistics for Small Areas across County Wexford for both SI scores and population, both overall and split by the seven transit supply categories.

There are 134,542 people living in Small Areas with SI scores below the County Wexford average (21.3), representing some 82% of the total 163,919 population. This includes the 52,946 people (32%) living in Small Areas with no transit supply at all, who mostly appear to live in rural areas.

⁸ Item T15_1_NC is the number of households without a motor car. Items T1_1 AGE60-64T, T1_1 AGE65-69T, ... T1_1 AGE80-84T and T1_1 AGE85T report persons aged 60 years and older; T8_1_UTWSDT reports the total number of people unable to work due to permanent sickness or disability; T8_1_TT reports the total population aged 15 years and over, while T8_1_WT reports the total at work, thereby allowing calculation of the number of adults (15+) not in the labour force; T8_1_ST reports the number of people aged 15 years and over who are students; and T1_1AGE5T, T1_1AGE6T ... T1_1AGE9T report the number of people aged 5 through 9. There does not appear to be any data available about low income households at the “Small Area” geographic area.

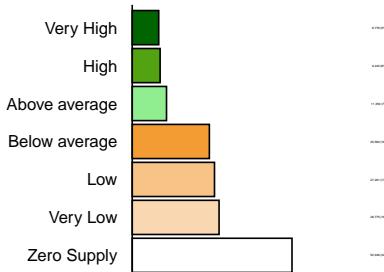


Figure 1: County Wexford: population by transit supply category

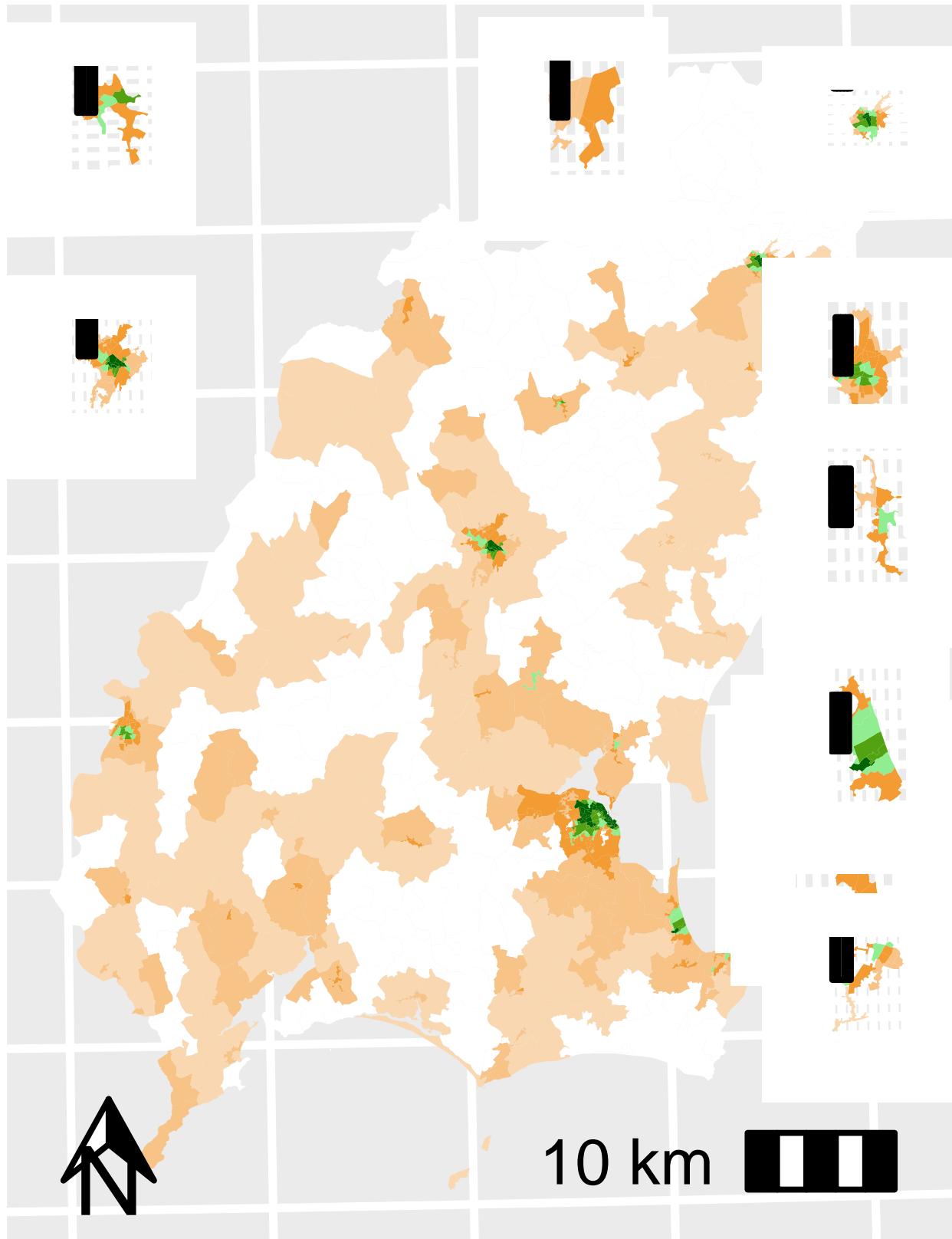


Figure 2: County Wexford: Small Areas by transit supply category

Table 1: Summary statistics, SI & pop.

Characteristic	Overall N = 620	Zero Supply N = 191	Very Low N = 102	Low N = 101	Below average N = 101	Above average N = 42	High N = 41	Very High N = 42
SI								
Min	0.0	0.0	0.0	0.8	10.0	31.5	54.9	91.7
Q ₁	0.0	0.0	0.1	1.4	13.3	35.5	61.9	115.4
Mean	21.3	0.0	0.3	3.9	19.1	40.5	68.5	151.3
Q ₃	23.1	0.0	0.4	6.4	23.8	45.1	75.1	181.7
100% Centile	280.9	0.0	0.8	10.0	30.5	53.6	88.4	280.9
Sum	13,219.3	0.0	29.8	395.7	1,929.9	1,699.6	2,810.1	6,354.1
population								
Min	73	73	121	135	105	97	127	93
Q ₁	203	217	221	216	187	220	177	150
Mean	264	277	282	270	253	270	225	209
Q ₃	311	321	338	318	299	294	276	240
100% Centile	623	623	545	552	548	525	369	510
Sum	163,919	52,946	28,775	27,261	25,560	11,359	9,240	8,778

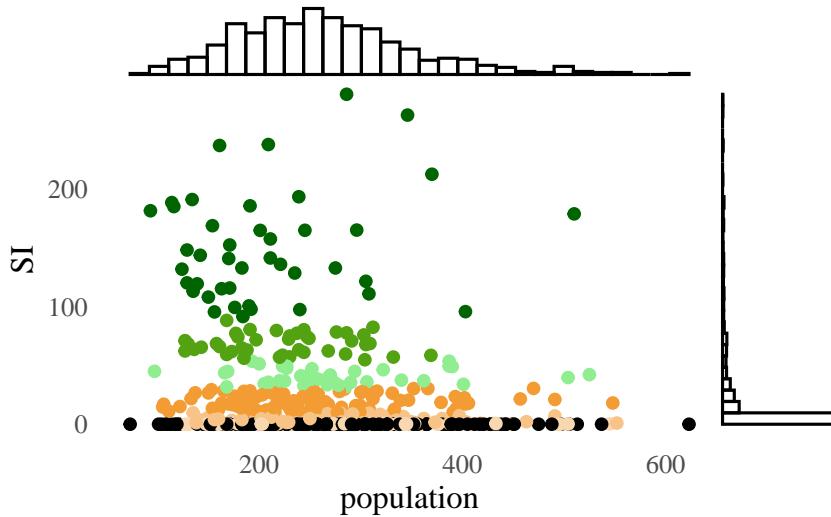


Figure 3: Country Wexford pop. vs SI

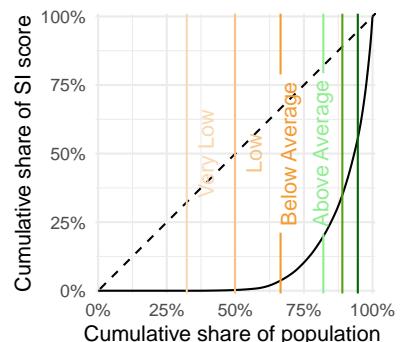


Figure 4: County Wexford: Lorenz curve

⁹ The distribution of SI scores across individual Small Areas appears highly skewed (skew = 2.95).

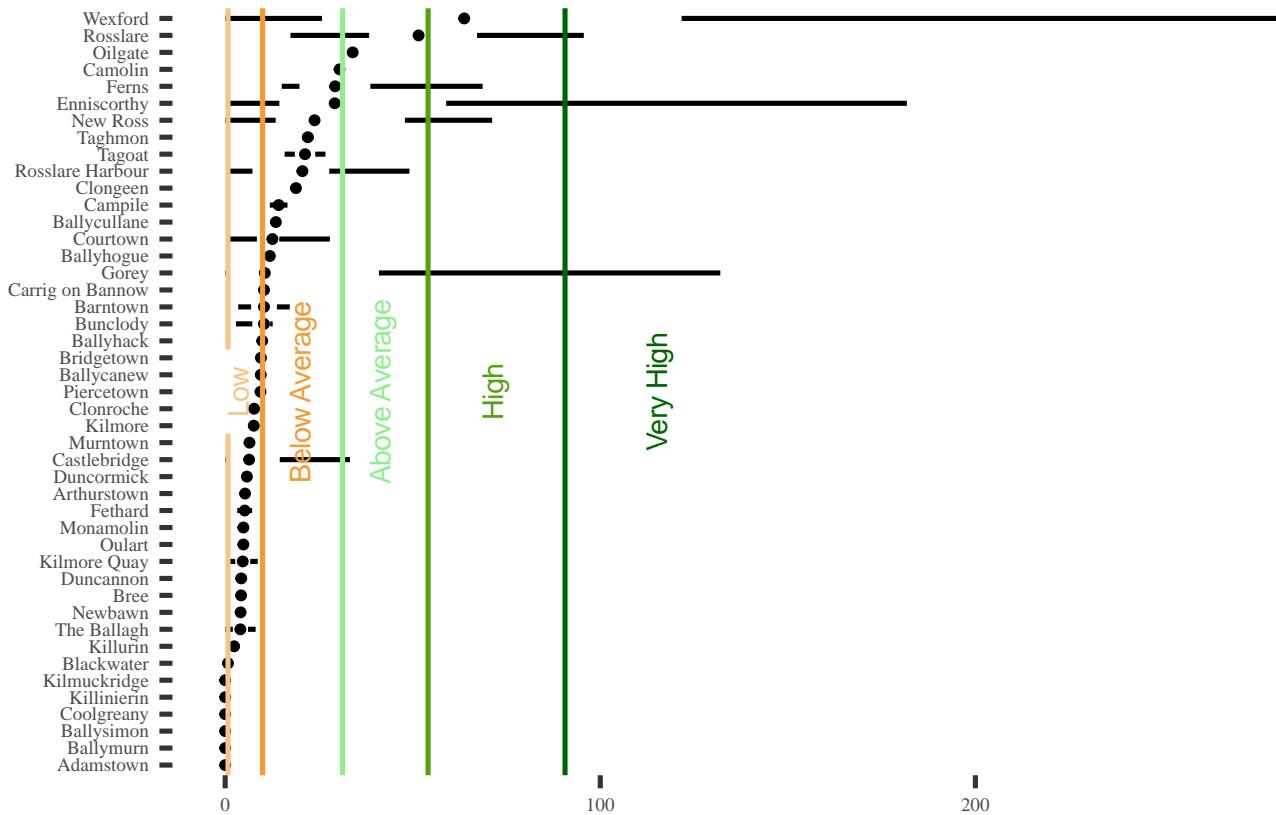
¹⁰ The Gini coefficient is 0.799

Figure 3 shows population and SI scores for individual Small Areas across County Wexford⁹, while Figure 4 shows a Lorenz Curve comparing the share of population and share of SI score. These indicate transit supply is relatively unequally distributed to the population¹⁰ and, for example, 75% of the transit supply service is provided within Small Areas that are home to just 15% of the total population.

In general, most of the transit supply appears to be provided within the various centres of population. Figure 5 shows boxplots of the SI scores for the various urban areas in County Wexford, while Table 1 summarises population in each Transit Supply category.

Table 1: County Wexford: urban populations in each Transit Supply grouping

Urban area	Transit Supply category							Total
	Zero Supply	Very Low	Low	Below average	Above average	High	Very High	
Wexford	5.4% (1,171)	0.9% (203)	6.4% (1,384)	17.9% (3,854)	14.8% (3,192)	21.9% (4,712)	32.6% (7,008)	100.0% (21,524)
Enniscorthy	0.0% (0)	0.0% (0)	21.6% (2,658)	38.8% (4,781)	19.5% (2,406)	11.5% (1,420)	8.5% (1,045)	100.0% (12,310)
Gorey	39.6% (4,566)	6.5% (754)	10.0% (1,152)	11.8% (1,364)	18.2% (2,100)	8.8% (1,012)	4.9% (569)	100.0% (11,517)
New Ross	2.6% (213)	0.0% (0)	15.7% (1,299)	47.4% (3,918)	14.9% (1,234)	19.3% (1,598)	0.0% (0)	100.0% (8,262)
Courtown	0.0% (0)	4.2% (184)	24.6% (1,073)	71.2% (3,108)	0.0% (0)	0.0% (0)	0.0% (0)	100.0% (4,365)
Rosslare Harbour	0.0% (0)	8.3% (187)	30.6% (687)	36.2% (814)	24.9% (559)	0.0% (0)	0.0% (0)	100.0% (2,247)
Castlebridge	38.2% (706)	0.0% (0)	13.8% (255)	33.0% (611)	15.0% (278)	0.0% (0)	0.0% (0)	100.0% (1,850)
Rosslare	0.0% (0)	0.0% (0)	0.0% (0)	20.0% (359)	52.4% (940)	18.9% (340)	8.7% (156)	100.0% (1,795)
Bunclody	0.0% (0)	0.0% (0)	44.3% (690)	55.7% (869)	0.0% (0)	0.0% (0)	0.0% (0)	100.0% (1,559)
Ferns	0.0% (0)	0.0% (0)	0.0% (0)	69.1% (910)	18.9% (249)	12.0% (158)	0.0% (0)	100.0% (1,317)
Kilmuckridge	100.0% (792)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	100.0% (792)
Taghmon	0.0% (0)	0.0% (0)	0.0% (0)	100.0% (740)	0.0% (0)	0.0% (0)	0.0% (0)	100.0% (740)
Ballymurn	100.0% (607)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	100.0% (607)
The Ballagh	49.1% (275)	0.0% (0)	50.9% (285)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	100.0% (560)
Ballycanew	0.0% (0)	0.0% (0)	49.1% (267)	50.9% (277)	0.0% (0)	0.0% (0)	0.0% (0)	100.0% (544)
Bridgetown	0.0% (0)	0.0% (0)	50.6% (275)	49.4% (269)	0.0% (0)	0.0% (0)	0.0% (0)	100.0% (544)
Tagoat	0.0% (0)	0.0% (0)	0.0% (0)	100.0% (507)	0.0% (0)	0.0% (0)	0.0% (0)	100.0% (507)
Barntown	0.0% (0)	0.0% (0)	66.3% (335)	33.7% (170)	0.0% (0)	0.0% (0)	0.0% (0)	100.0% (505)
Blackwater	0.0% (0)	67.6% (328)	32.4% (157)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	100.0% (485)
Camolin	0.0% (0)	0.0% (0)	0.0% (0)	100.0% (470)	0.0% (0)	0.0% (0)	0.0% (0)	100.0% (470)
Kilmore Quay	0.0% (0)	47.4% (212)	52.6% (235)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	100.0% (447)
Oilgate	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	100.0% (401)	0.0% (0)	0.0% (0)	100.0% (401)
Coolgreany	100.0% (395)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	100.0% (395)
Carrig on	0.0% (0)	0.0% (0)	0.0% (0)	100.0% (391)	0.0% (0)	0.0% (0)	0.0% (0)	100.0% (391)
Bannow								
Campile	0.0% (0)	0.0% (0)	0.0% (0)	100.0% (371)	0.0% (0)	0.0% (0)	0.0% (0)	100.0% (371)
Fethard	0.0% (0)	0.0% (0)	100.0% (363)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	100.0% (363)
Oulart	0.0% (0)	0.0% (0)	100.0% (362)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	100.0% (362)
Murntown	0.0% (0)	0.0% (0)	100.0% (342)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	100.0% (342)
Ballysimon	100.0% (331)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	100.0% (331)
Clonroche	0.0% (0)	0.0% (0)	100.0% (329)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	100.0% (329)
Adamstown	100.0% (326)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	100.0% (326)
Bree	0.0% (0)	0.0% (0)	100.0% (316)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	100.0% (316)
Piercetown	0.0% (0)	0.0% (0)	100.0% (308)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	100.0% (308)
Duncannon	0.0% (0)	0.0% (0)	100.0% (281)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	100.0% (281)
Killinierin	100.0% (270)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	100.0% (270)
Clongeen	0.0% (0)	0.0% (0)	0.0% (0)	100.0% (263)	0.0% (0)	0.0% (0)	0.0% (0)	100.0% (263)
Ballyhogue	0.0% (0)	0.0% (0)	0.0% (0)	100.0% (255)	0.0% (0)	0.0% (0)	0.0% (0)	100.0% (255)
Monamolin	0.0% (0)	0.0% (0)	100.0% (250)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	100.0% (250)
Ballycullane	0.0% (0)	0.0% (0)	0.0% (0)	100.0% (230)	0.0% (0)	0.0% (0)	0.0% (0)	100.0% (230)
Killurin	0.0% (0)	0.0% (0)	100.0% (223)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	100.0% (223)
Ballyhack	0.0% (0)	0.0% (0)	100.0% (211)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	100.0% (211)
Kilmore	0.0% (0)	0.0% (0)	100.0% (194)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	100.0% (194)
Duncormick	0.0% (0)	0.0% (0)	100.0% (191)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	100.0% (191)
Newbawn	0.0% (0)	0.0% (0)	100.0% (183)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	100.0% (183)
Arthurstown	0.0% (0)	0.0% (0)	100.0% (149)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	100.0% (149)
Total	12.1% (9,652)	2.3% (1,868)	18.1% (14,454)	30.7% (24,531)	14.2% (11,359)	11.6% (9,240)	11.0% (8,778)	100.0% (79,882)



As might be expected, those places with larger populations tend to have more transit supplied, but this appears to apply only in general terms. Notably, New Ross, Courttown, Rosslare Harbour and Castlebridge do not have any Small Areas with Very High transit supply, and the later three do not have any with High supply either. Rosslare itself, however has some Small Areas with High and Very High transit supply, despite having fewer residents. Further down the list, Ferns appears to have more transit supply than might be expected for its population, while Kilmuckridge, Ballymurn, Coolgreany, Ballysimon, Adamstown and Killinierin have no transit at all despite their populations being higher than many places that do have at least some transit. If only considering Small Areas within named urban areas (as per Table 1), the distribution of transit supply to the population still appears to be relatively unequal (Figure 3, right, Gini coefficient of

SOCIAL NEEDS FOR TRANSPORT:

Figure 3 shows Small Areas across County Wexford, categorised by social need for transport, while Figure 4 shows the population living in Small Areas in each category. There are 91,894 people living in Small Areas that have above the average score (across all Small

Figure 5: County Wexford urban areas: boxplot of Small Area SI scores

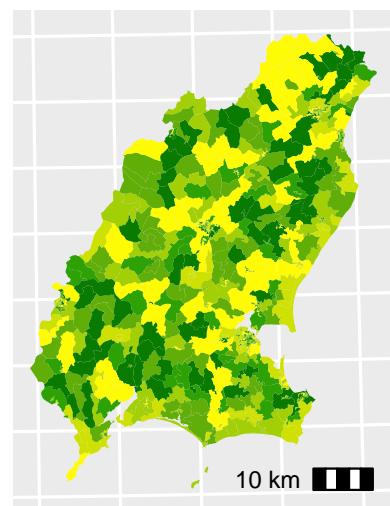


Figure 6: County Wexford: Small Area, by social need for transport category

Areas in County Wexford) for social needs for transport, representing some 56% of the total population (163,919). This includes the 37,452 people (23%) living in Small Areas with Very High social needs for transport.

NEEDS-GAP:

Table 2 shows the share of the County Wexford population living in Small Areas with each combination of the transit supply and social need for transport categories. Figure 3 maps the Small Areas by each combination, with those that have similar needs-gaps shown using the same colours, as shown in Table 2.

Table 2: County Wexford, population in each Transit Supply and Combined Needs grouping

Supply	Combined Needs Index Category						Total
	Very High	High	Above average	Below average	Low	Very Low	
Zero Supply	36.5% (13,678)	39.9% (11,480)	28.8% (7,394)	34.4% (10,092)	26.5% (6,509)	20.9% (3,793)	32.3% (52,946)
Very Low	22.3% (8,367)	22.7% (6,530)	12.0% (3,091)	15.6% (4,565)	14.8% (3,651)	14.2% (2,571)	17.6% (28,775)
Low	14.3% (5,362)	20.5% (5,898)	18.7% (4,810)	16.2% (4,734)	18.7% (4,590)	10.3% (1,867)	16.6% (27,261)
Below average	15.5% (5,799)	7.8% (2,250)	18.0% (4,613)	15.4% (4,517)	17.9% (4,405)	21.9% (3,976)	15.6% (25,560)
Above average	6.9% (2,594)	3.6% (1,024)	8.8% (2,265)	8.6% (2,516)	9.6% (2,360)	3.3% (600)	6.9% (11,359)
High	1.0% (369)	3.3% (945)	9.1% (2,326)	6.6% (1,920)	6.0% (1,465)	12.2% (2,215)	5.6% (9,240)
Very High	3.4% (1,283)	2.3% (654)	4.5% (1,162)	3.3% (959)	6.6% (1,626)	17.1% (3,094)	5.4% (8,778)
Total	100.0% (37,452)	100.0% (28,781)	100.0% (25,661)	100.0% (29,303)	100.0% (24,606)	100.0% (18,116)	100.0% (163,919)

Differences in the share of Small Areas in each transit supply category across the different social need for transport groups were statistically significant ($\chi^2(30) = 69.11, p < .001$). In general, those living in Small Areas with higher social needs for transit appeared to be more likely to also have lower levels of transit supply. For example, 89% of those living in Small Areas with Very High social needs for transport had below average transit supplies, compared to just 67% of those living in Small Areas with Very Low social needs for transport. Out of the total 163,919 population of County Wexford, some 32,552 (20%) live in Small Areas with social needs for transport that are above the County average, but where there is no transit supply at all.

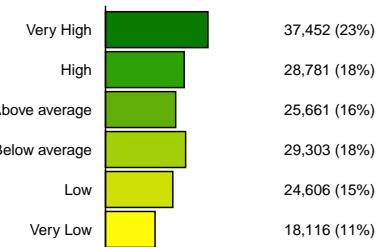


Figure 7: County Wexford: population living in Small Areas, by social need for transport category

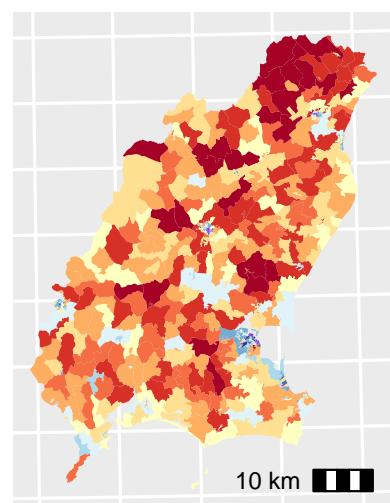


Figure 8: County Wexford, Needs-gap by Small Area

